Immingham Green Energy Terminal

9.3 Applicant's Responses to the Examining Authority's First Written Questions

(Responses to "Q1.4. Design")

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1 Introduction

Overview

1.1 This document has been prepared to accompany an application made to the Secretary of State for Transport (the "Application") under section 37 of the Planning Act 2008 ("PA 2008") for a development consent order ("DCO") to authorise the construction and operation of the proposed Immingham Green Energy Terminal ("the Project").

1.2 The Application is submitted by Associated British Ports ("the Applicant"). The Applicant was established in 1981 following the privatisation of the British Transport Docks Board. **The Funding Statement [APP-010]** provides further information.

1.3 The Project as proposed by the Applicant falls within the definition of a Nationally Significant Infrastructure Project ("NSIP") as set out in Sections 14(1)(j), 24(2) and 24(3)(c) of the PA 2008.

The Project

1.4 The Applicant is seeking to construct, operate and maintain the Immingham Green Energy Terminal, comprising a new multi-user liquid bulk green energy terminal located on the eastern side of the Port of Immingham (the "Port").

1.5 The Project includes the construction and operation of a green hydrogen production facility, which would be delivered and operated by Air Products (BR) Limited ("Air Products"). Air Products will be the first customer of the new terminal, whereby green ammonia will be imported via the jetty and converted on-site into green hydrogen, making a positive contribution to the UK's net zero agenda by helping to decarbonise the United Kingdom's (UK) industrial activities and in particular the heavy transport sector.

1.6 A detailed description of the Project is included in **Chapter 2: The Project** of the Environmental Statement ("ES") **[APP-044]**.

Purpose and Structure of this Document

1.7 This document contains the Applicant's responses to those of the Examining Authority's Written Questions 1 **[PD-008]** grouped under the theme "Q1.4. Design". It represents one of a collection of eighteen such documents, each of which addresses a different theme.

1.8 Responses are ordered ascendingly by reference number, replicating the structure of the Examining Authority's Written Questions 1.

1.9 Responses are provided in a table. The text of the question appears on the lefthand side, with the Applicant's answer to its right.

1.10 Further materials pertinent to the Applicant's response are included at the end of the document as appendices where necessary.

2 Applicant's Responses to the Examining Authority's First Round of Written Questions

Q1.4. Design	
Q1.4.1 Content of Documents	
Q1.4.1.1	
Question	**Response**
How has Design mitigated other development effects The NPSfP (Paragraph 4.10.2) states "Good design is also a means by which many policy objectives in the NPS can be met, for example the impact sections show how good design and use of appropriate technologies can help mitigate adverse impacts such as noise." Whilst the ES [APP-049] [APP-050] [APP-051] [APP-055] [APP-057] [APP059] states that the development has been designed to mitigate adverse impacts, it is not clear from the above documents which specific design features will be employed in each case. Tabulate which design features are relevant to each potential adverse impact identified and how they will assist in mitigation.	In accordance with Paragraph 4.10.2 of the National Policy Statement for Ports ("NPSfP"), good design and the use of appropriate technologies have been used to mitigate adverse impacts of the Project. As explained in each of the **Environmental Statement ("ES")** chapters that are referred to in the question, the Project has been designed, as far as possible, to avoid and minimise impacts and subsequent effects through the process of design development, and by embedding mitigation measures into the design of the Project. This has been achieved through the parameters as set out in **Section 2.4** of **ES Chapter 2: The Project [APP-044]**.The relevant ES chapters are as follows: • **Chapter 7: Noise and Vibration [APP-049]** • **Chapter 8: Nature Conservation (Terrestrial Ecology) [APP-050]** • **Chapter 9: Nature Conservation (Marine Ecology) [APP-051]** • **Chapter 13: Landscape & Visual Impact [APP-055]** • **Chapter 15: Historical Environment (Marine) [APP-057]** • **Chapter 17: Marine Water and Sediment Quality [APP-059]**

Set out below are the permanent design and technology features that provide mitigation for potential impacts that are identified in the chapters listed above. The table does not cover design mitigation measures that address potential impacts during the construction phase and which would be temporary in nature.

Potential impact	Design Feature/Mitigation Provided
Noise and Vibration	
Potential impact to residential noise sensitive receptors on the eastern edge of Immingham from on-site plant noise and operations.	Requirement 17 of Schedule 2 of the **draft Development Consent Order ("DCO") [PDA-004]** requires a scheme for noise management to be submitted and approved by North East Lincolnshire Council ("NELC") as local planning authority. The following design and technological mitigation measures may be included as appropriate within that scheme: • Reducing the breakout noise from plant through the use of enhanced enclosures, or potentially containing them within a building. • Reducing air inlet noise emissions by the addition of further in-line attenuation.

		• Reducing Flare Stack outlet noise emissions by the addition of silencers or sound proofing panels. • Reducing fan noise emissions by screening, re-sizing, fitting low noise fans or attenuation. • Screening or enclosing the compressors or other equipment. • Orientation of plant within the site to provide screening of low-level noise sources by other buildings and structures, or orientating fans and the air inlets away from sensitive receptors. Implementation of these measures will reduce the transmission of noise from the Project during operation.
	Nature Conservation (Terrestrial Ecology)	
	Loss of woodland habitat at the Long Strip woodland, including a veteran tree.	The design of the pipe rack and jetty access road (Work No. 2) has minimised woodland loss as far as possible. This embedded design feature therefore reduces the impact on the Long Strip woodland and avoids the loss of a veteran tree.

		The Project also includes compensation measures for the loss of woodland within the Long Strip woodland which includes off-site woodland creation and management within a specified location, enhancement of retained parts of the Long Strip Tree Preservation Order woodland north of Laporte Road and agreement of a woodland compensation plan with the local planning authority (Requirement 11 in Schedule 2 of the **draft DCO [PDA-004]**).
	Loss of bat roosts	Whilst a tree will be removed that supports a bat roost, the **Outline Landscape and Ecological Management Plan [APP-225]** (the final landscape and ecology measures to be secured through Requirement 10 in Schedule 2 of the **draft DCO [PDA-004]** and to be in accordance with that plan) proposes the installation of bat boxes to provide alternative places for roosting.
	Potential impact of lighting disturbance to foraging bats.	The **Lighting Strategy [APP-173]** (secured through Requirement 16

	Potential visual disturbance to otter. Potential damage/loss of habitat and noise and visual disturbance to water vole.	in Schedule 2 of the **draft DCO [PDA-004]**) includes a sensitive permanent lighting design to minimise light spill to retained habitats, relevant to bats, water voles and otters. The design has ensured there will be no loss of water vole or otter habitats.
	Nature Conservation (Marine Ecology)	
	Direct and indirect loss and change of intertidal and subtidal habitats and species as a result of the Project.	The design of the jetty structure and approach to piling has sought to minimise impacts to intertidal and subtidal habitats. This has considered a combination of pile location, spacing, size and number to minimise direct and indirect effects. The **Without Prejudice Report to inform Habitats Regulations Assessment (HRA) Derogation [APP-235]** sets out the alternatives considered (see **Table 1**). The location of the jetty berth forming part of the Project within an area of naturally deep water

		has minimised the capital and maintenance dredging requirements.
	Landscape and Visual Impact	
	Potential impact to the landscape and seascape of the project site and immediate setting.	Given the scale and nature of the Project, there is limited potential for mitigation measures; however, where possible and within the constraints of the Project, landscape elements are proposed which would assist in integrating the Project into the receiving landscape. The **Outline Landscape and Ecological Management Plan [APP-225]** proposes a range of measures including wildflower grassland creation in peripheral areas of the site to provide ecological niches for terrestrial invertebrates and feeding habitat for birds, and planting of native trees, shrubs and hedgerows in peripheral areas of the site to create nesting habitat for birds (once matured) and to provide sources of berries for overwintering birds. The Outline Landscape and Ecological Management Plan is secured under Requiremenmt 10 in

		Schedule 2 of the draft DCO **[PDA-004].**
	Impact on recreational users at Viewpoint 2 Public Right of Way ("PRoW") and proposed England Coast Path Route and impact on recreational users at Viewpoint 3 bridleway/PRoW and proposed England Coast Path Route.	Appropriate finishes will be used on certain buildings or structures to minimise adverse impacts on visual amenity. Whilst the selection of finishes for some buildings will be dictated by their function, the paint finish of the ammonia tank (Work No. 3) and the external materials of any security building within Work No. 2, any control building within Work No. 5 or any control room and workshop building, security and visitor building, contractor building and warehouse within Work No. 7 will be submitted for approval by the local planning authority. This is secured by Requirement 4 in Schedule 2 of the **draft DCO [PDA-004]**. The **Lighting Strategy [APP-173]** (secured through Requirement 16 in Schedule 2 of the **draft DCO [PDA-004]**) includes a sensitive permanent lighting design to reduce unnecessary light spill outside of the site boundary.

	Historical Environment (Marine)	
	Direct and indirect impacts on known and potential marine cultural heritage receptors and deposits of archaeological importance as a result of changes to the physical regime of the estuary in the presence of the Project, operational activities and maintenance dredging.	The design of the jetty structure and approach to piling has sought to minimise impacts to intertidal and subtidal habitats. This has considered a combination of pile location, spacing, size and number to minimise direct and indirect effects. The **Without Prejudice Report to inform Habitats Regulations Assessment (HRA) Derogation [APP-235]** sets out the alternatives considered (see **Table 1**). The location of the jetty berth forming part of the Project within an area of naturally deep water has also minimised the capital and maintenance dredging requirements.
	Marine Water and Sediment Quality	
	Changes to marine water and sediment quality during the maintenance dredging and disposal activities.	The location of the jetty berth forming part of the Project within an area of naturally deep water has minimised the capital and maintenance dredging requirements.

Q1.4.1.2	
Question	**Response**
Design Evolution The Design Evolution document provides limited details regarding the design development process up to the point of the submission of the application and even less information on any detailed design process post consent (should consent be granted) [APP-233]. The ExA is unclear how you have met the policy requirements in NPSfP and requires further evidence to demonstrate how you have taken into account the importance which the PA2008 places on good design. For this purpose, provide the following information in line with the NPSfP (Paragraphs 4.10.1 to 4.10.5). In providing your response, emphasis should be given that ultimately the SoS needs to be satisfied that the Proposed Development would deliver design outcomes that are attractive, durable and adaptable and that you have taken into account both functionality (including fitness for purpose and sustainability) and aesthetics (including its contribution to the quality of the area in which it would be located). a) Demonstrate how the design process was conducted, the professional expertise and the local knowledge that was that was engaged in the process, and how the proposed design evolved. b) Were different designs considered for different components of the Proposed Development? Set out the reasons why you	**Introduction and overview** Before addressing the specific questions raised under parts a) to f), the Applicant provides some contextual background, which reflects the position presented orally at Issue Specific Hearing 2 ("ISH2") and which is further expanded upon in the detailed responses that follow. The policy context for the consideration of this issue is set by the National Policy Statement for Ports ("NPSfP"). This falls to be considered along with any design related matters contained within the Planning Act 2008 ("PA 2008"). At the outset, however, the Applicant emphasises that when considering design matters, it is not only important, as indicated in the NPSfP and as discussed below, to take account of the ultimate purpose of the infrastructure proposed and bear in mind the operational, safety and security requirements which the design has to satisfy, but also to understand the context of the site and its surroundings. In this case, the Project is proposed to be located in and adjacent to the Port of Immingham within an area that is heavily industrial in nature, being dominated by port infrastructure, chemical manufacturing, oil processing and power generation facilities. In addition, the land on which the Project is proposed is allocated for employment development within an area where the type of activity proposed is within key employment sectors identified in the local plan, the further development of which is encouraged. The site sits within the identified Estuary Zone, an area identified as being of industrial

favoured the choice that you have selected, highlighting where operational, safety and security requirements influenced your decision-making. c) What are your overarching design principles that have driven detailed design process do far and would drive it forward during Examination and post consent (should consent be granted)? d) In line with NPSfP, the demonstrate how the ExA and the SoS can be satisfied that your proposed overarching design principles would deliver the following NPSfP policy requirements: • high quality and inclusive design; • functionality, fitness for purpose and sustainability; • sensitivity to place that demonstrates good design relative to existing landscape character, landform and vegetation; • efficient in the use of natural resources and energy used in construction and operation; • appearance that demonstrates good aesthetic; • use of appropriate technologies can help mitigate adverse impacts; • sustainably designed, having regard to regulatory and other constraints; and • taking account of natural hazards such as flooding. e) Set out the main stages of the remainder of the design process (marine and landside) required to fully develop the	importance. Furthermore, and in addition to existing development, the surroundings of the site – reflecting its industrial nature – have a number of extant planning permissions or consents for large scale industrial type developments (which contain significant proposed built elements) which have yet to be implemented, including: • The Velocys sustainable transport fuels facility on land at Hobson Way (ref: DM/0664/19/FUL). • The South Humber Bank Power Station on land at Hobson Way (ref: DM/1070/18/FUL). • The North Beck Energy Recovery Facility on land south of Queens Road (ref: DM/0026/18/FUL). • Within the wider surrounds, the Able Marine Energy Park Nationally Significant Infrastructure Project on land between the Port of Immingham and the Port of Killingholme. The main design related policy within the NPSfP is provided at Section 4.10. Paragraph 4.10.1 makes clear that: (i) Good design is not just about the visual appearance of the development. High quality and inclusive design go far beyond aesthetic considerations. (ii) Functionality of the development, including fitness for purpose and sustainability, is equally important in terms of achieving good design. (iii) Applying 'good design' should produce sustainable infrastructure sensitive to place, efficient in the use of natural resources and energy used in their construction and operation,

design of the Proposed Development during Examination, and post consent (should consent be granted). f) Explain how the principles driving the design of the Proposed Development are secured in the dDCO.	matched by an appearance that demonstrates good aesthetics as far as possible (emphasis added). (iv) The nature of much port infrastructure development will often limit the extent to which it can contribute to the enhancement of the quality of the area.
	Against that context, Paragraph 4.10.3 goes on to indicate that the decision maker needs to be satisfied that port infrastructure developments: (a) Are sustainably designed (b) Have regard to regulatory and other constraints, are as attractive, durable and adaptable as they can be (emphasis added). In respect of being sustainably designed, it is noted that NPSfP Paragraph 3.3.3 further highlights that in terms of achieving sustainable development new port infrastructure should be, amongst other things, "well designed, functionally and environmentally". In respect of being satisfied that port infrastructure development is as attractive, durable and adaptive as it can be, Paragraph 4.10.3 further makes it clear that the decision maker should satisfy itself that the Applicant has taken into account as far as possible (emphasis added) both: • Functionality – including fitness for purpose and sustainability, and • Aesthetics – including its contribution to the quality of the area in which it is to be located In doing this, the policy recognises that the Applicant may well have no or very limited choice in the physical appearance of some port infrastructure,

	but that there may be opportunities for the Applicant to demonstrate good design relative to existing landscape character, landform and vegetation. In respect of the landside hydrogen production facility, it is noted that the recently published Overarching National Policy Statement for Energy ("EN-1") provides similar policy guidance to that contained within the NPSfP (see EN-1 Paragraphs 4.7.1 to 4.7.4). In terms of considering the design choices made by the Applicant, NPSfP Paragraph 4.10.4 makes it clear that the decision-maker should take into account the ultimate purpose of the infrastructure and bear in mind the operational, safety and security requirements which the design has to satisfy. The detailed answers below explain that the design of the Project as applied for does not represent a full and final detailed design. Ongoing detailed design work – within the scope of the parameters and controls set by various aspects of the Development Consent Order ("DCO") application – will continue during the Examination process and following the grant of the DCO (assuming, of course, that the DCO is granted). However, as explained in the detailed answers that follow, the design of the Project is largely determined by operational requirements, technical (including regulatory and safety) requirements and environmental requirements and matters. In terms of aesthetics and matters relating to the visual appearance of the development, where there remains some flexibility in what can be provided, the **draft DCO [PDA-004]** includes the ability for the detail of such matters to be subsequently approved by North East Lincolnshire Council ("NELC") as the local planning authority. This includes:

	• **Requirement 4**: which requires details of the external paint finish of the ammonia tank to be submitted to and approved by NELC. • **Requirement 4**: which requires details of the external materials of certain specified buildings to be submitted to and approved by NELC. • **Requirement 8**: which requires the details of the design and layout of any permanent access or alteration to an existing means or access to a highway (i.e. road junction design) to be submitted to and approved by NELC. • **Requirement 10**: which requires the details of landscape and ecology measures and a plan for their establishment and maintenance to be submitted to and approved by NELC, which in turn are to be based on the **Outline Landscape and Ecology Management Plan [APP-225]**. • **Requirement 11**: which requires the submission and approval by NELC of a Woodland Compensation Plan which must accord with the **Outline Woodland Compensation Strategy [APP-224]** which gives NELC influence over the design and appearance of that woodland planting. • **Requirement 16**: which requires a scheme for operational external lighting to be submitted to and approved by NELC. The combined effect of those controls, and the processes they put in place, is that the local planning authority (NELC) is able to approve the details of certain matters where that is reasonable and appropriate having regard to the functional and practical requirements associated with compliance with other regulatory regimes. Insofar as the approval of such details affect the overall aesthetic qualities of the Project, this gives the

	local planning authority the means to ensure it will be as attractive as it can be. In terms of sustainability matters, as indicated above, the NPSfP provides separate guidance at Paragraph 3.3.3 on what it considers will contribute to the Government's policies on sustainable development in respect of new port infrastructure. The matters raised in this part of the NPSfP are considered in **Appendix A** of the **Planning Statement [APP-227]** which demonstrates that the Project would help meet the requirements of the Government's policies on sustainable development. Finally by way of introductory context, and for completeness, at Issue Specific Hearing 2 the Examining Authority made mention of section 183 of the PA 2008 in respect of design matters. The Applicant notes that section 183 comes within Part 9 of the PA 2008 'Changes to existing planning regimes' and does not apply to the determination of applications for development consent. **a) Demonstrate how the design process was conducted, the professional expertise and the local knowledge that was engaged in the process, and how the proposed design evolved.** ***Summary of response to part a) of the question*** The design of each aspect of the Project has evolved from feasibility stage to the parameters and form of design presented in the DCO application documentation. This process has been informed by operational requirements, technical (including regulatory and safety) requirements and environmental requirements and matters and has taken account of technical work, information obtained on environmental constraints and emerging from the assessment process, stakeholder

	inputs, local knowledge (including in respect of the local context) and wider technical and specialist input. The evidence below demonstrates that all components of the Project have been subject to a thorough design process to ensure that the jetty, jetty access road and hydrogen production facility are well designed, functionally and environmentally, and are as durable, adaptable and attractive as they can be. In addition, the evidence below demonstrates that appropriate expertise has been employed in the design of the Project. ***The jetty and jetty access road design process (Work Nos. 1, 1a and 2)*** The design development of the jetty and the jetty access road followed the Royal Institute of British Architects ("RIBA") Plan of Work 2020 stages of project development, which organises the process of briefing, designing, constructing and operating projects into eight stages and defines outcomes, core tasks and information exchanges required at each stage. Adopting this process provides a structured framework within which the design is developed and evolved. RIBA Stage 1 (Feasibility – Preparation and Briefing) and then Stage 2 (Concept Design) were carried out for these elements of the Project prior to submission of the DCO application. RIBA Stage 1 comprised numerous multi-disciplinary tasks to collect, review and appraise Project information and identify and procure additional data required to inform the jetty design. This included engagement and coordination via regular meetings and workshops with key stakeholders (including but not limited to ABP, the Harbour Master ("HM"), the Environment Agency ("EA"), NELC, the Internal Drainage Board ("IDB"), Northern Power Grid ("NPG"), Anglian Water ("AW"),

	Associated Petroleum Terminals ("APT"), the first customer of the jetty Air Products and a potential further future customer, Harbour Energy ("HE")). External constraints from other local stakeholders were fed back to the design team via ABP's stakeholder management team. In addition, physical surveys (e.g. bathymetry, topographical and utility services, etc.), desk top studies (e.g. ground investigation data, environmental condition data, etc.), numerical studies (e.g. hydrodynamic, metocean (the combined effect of meteorology and oceanography), ship fit-up and ship navigation modelling), safety and hazard studies, were carried out to inform the preparation of a Basis of Design ("BoD") and the definition of the jetty's operational requirements. A similar process of determining the operational requirements of the jetty access road was also undertaken. Throughout the process, compliance with operational and technical requirements has guided the evolution of the design of these elements. As part of ensuring such compliance all relevant structures needed to adhere to best practice design and be fully compliant with current industry codes of practice and British Standards. These factors, in conjunction with the location of the infrastructure in or adjacent to an environmentally sensitive location, necessarily impacted upon the opportunities to further develop the layout and visual appearance of this infrastructure from a purely aesthetic point of view. RIBA Stage 2 (Concept Design) further developed the Stage 1 work, progressing it towards a concept design. It comprised numerous multi-disciplinary tasks to further develop the Project, continued active engagement and coordination with local stakeholders and end users, and updated the definition of functional and operational requirements and BoD. Further physical surveys, desk top studies, numerical studies, and safety and hazard studies were also carried out as appropriate and necessary. Preliminary structural, marine, drainage, mechanical, electrical

	and lighting work was also carried out to further develop the concept design of the jetty in compliance with relevant industry codes of practice to ensure a safe, buildable, robust, efficient, low maintenance and durable design that follows best practice and which satisfies operational and technical requirements whilst continuing to have regard to the environmentally sensitive nature of the location of the proposed infrastructure. Since the submission of the DCO application the RIBA Stage 2 concept design has further developed as part of RIBA Stage 3 (Spatial Coordination/Scheme Design). This has comprised further studies and updates to develop and optimise the concept design. This stage, however, has not yet been fully completed due to the need to initiate the project procurement process and engage a specialist marine works contractor to design and, if consent is granted, construct the jetty, using its design and construction skills and experience to deliver the Project. Once under contract, the contractor will further progress and complete RIBA Stage 3 and then go on to progress subsequent stages of the RIBA Plan of Work 2020. Throughout the RIBA Plan of Work 2020 stages, quality assurance has been achieved through internal checking and peer review based on industry standard project execution and technical quality management processes employed by the party undertaking the work (Ramboll) in line with its ISO 9001, 14001 and 45001 accredited Quality Management System. That party has also drawn on its experience of working to ISO 44001 (Collaborative Business Relationships). The design was undertaken in parallel with, and in collaboration with, the Environmental Impact Assessment team so that any critical mitigation measures were able to be implemented into the design.

	Professional expertise Numerous professional consultant organisations and expertise (including but not limited to ABP internal operational and engineering expertise, ABPMer, Air Products, OLG Engineering, Ramboll, Jacobs Solutions, HR Wallingford, AECOM and Anatec) have been involved in the jetty design process and have used their professional personnel from multiple disciplines (personnel benefiting from expertise and extensive experience from similar local and national projects) to develop the design for the jetty element of the Project. Ramboll undertook the RIBA Stage 1 and 2 design of the jetty and jetty access road. The lead Ramboll team comprised Chartered Civil Engineers with over 20 years of experience bringing specific skills in project and design management, with access to subject matter experts ("SMEs") within the UK and the wider global Ramboll organisation. All discipline leads and subject matter experts have demonstrable skill and competency through accreditation in leading engineering organisations and extensive years of experience. The technical team was supported by a dedicated Project Interface and Building Information Management ("BIM") team to assist with project delivery and risk management. Amongst other things, the Ramboll team drew on experience from other local projects, including Green Port Hull, the Grimsby River Terminal, Henderson Dry Dock and the provision of ongoing support to ABP in other areas of the Port of Immingham. Jacobs undertook the programme management for the Project and the RIBA Stage 1 and 2 technical peer review of the jetty and jetty access road, providing ABP with an overarching project management function for the design activities and technical guidance and assurance. Jacobs' technical peer review team comprised SMEs who were all senior professionals and highly capable leading industry experts in their

	engineering discipline. These included chartered structural, civil, marine, construction, dredging, materials, geotechnical, electrical, mechanical, process, fire, safety and environmental engineering and scheduling professionals who have demonstrated a high level of competence though achievement of corporate membership of learned professional engineering institutions and the Engineering Council. Jacobs' technical peer review team were also able to call upon the expertise from its global engineering resources. In all cases, the Jacobs' SMEs were experienced accredited professionals with extensive experience in similar projects. This includes experience in the design management and delivery of liquid product import/export jetty projects and five other jetties located at the Port of Immingham (West Lead-in jetty, Humber International Terminal ("HIT") Phase 1, HIT Phase 2, Immingham Outer Harbour ("IOH") Berth 4 and IOH Ro-Ro Pier). Jacobs' technical peer review team fully integrated and continually engaged, interfaced and coordinated with ABP's operations and engineering teams and Ramboll's Technical team throughout the whole design process of RIBA Stages 1 and 2. *Local knowledge* Local knowledge was obtained and used throughout RIBA Stages 1 and 2 through regular liaison, engagement and coordination with ABP's operational and engineering teams and the first customer, Air Products, who provided informed and valuable local knowledge and operational experience, and who discussed and challenged design assumptions, judgements and decision points. Other stakeholders (e.g. the EA, IDB, AW, APT, HM, etc.) were also consulted as appropriate and their feedback was taken into account. For

	example, the HM was consulted on the matter of safe navigation, berthing and mooring of ships and the EA was consulted regularly on their current and future requirements for access, inspection and maintenance to the existing flood defence. APT, who occupy the site adjacent to the jetty access road and operate the neighbouring Immingham Oil Terminal ("IOT") jetty, were consulted on their operational experience at the IOT jetty (from a ship mooring and berthing perspective), on their ability to facilitate EA emergency access to the flood defence, on their requirements for security and on their requirements for an emergency egress route which runs adjacent to the jetty access road. During the two rounds of pre-application consultation, the local knowledge of other stakeholders was also obtained and their views and comments on the Project taken into account as appropriate. The Project has also been informed by the process of environmental assessment and stakeholder input from statutory environmental bodies and NELC. *Design development and evolution* The design for the jetty has evolved and developed since the start of RIBA Stage 1. Some examples are provided below, although it should be noted this is a non-exhaustive list and that some of the studies and work referred to remain commercially confidential: • Work on vessel characteristics, navigation simulation modelling, safety reviews and hazard identification and risk work, assessment of capital and maintenance dredge material volumes and disposal locations, and stakeholder consultations with ABP, APT and HM undertaken during RIBA Stage 1 informed the proposed location and alignment of the jetty's berthing line, which is offset from, and aligned with, the neighbouring IOT jetty berth and berthing line. The location

	achieves the required separation between moored ships, provides sufficient clearance to the main navigation channel (so as not to unacceptably impact upon the existing IOT jetty operations and the navigation of vessels in the River Humber), provides sufficient water depth for safe navigation access, berthing and mooring of ships, and minimises capital and maintenance dredging extent (the need for future maintenance dredging at the proposed jetty berth pocket is expected to be very limited, if required at all). • Vessel characteristics work and the assessment of capital and maintenance dredge material volumes and disposal locations assisted in informing the decision to limit the jetty to a single berth instead of the two berths which were originally considered at the outset of the design process. It was confirmed that a single berth was able to accommodate the full range of vessels expected. • Matters such as tidal conditions, the result of metocean studies, functional and operational requirements informed the minimum deck soffit elevations of all jetty structures. • Vessel characteristic work and the need to adhere to ship mooring guidance informed the maximum deck elevations of the mooring and breasting dolphins. • The functional, safety, and security requirements of ABP's operations team and the end users informed the spatial extents and layout of the jetty access road and pipe racks, buildings and the jetty head loading platform and breasting dolphins. • Vessel characteristics, topside marine loading arm positions, fender and mooring requirements informed the spatial extents and locations of the jetty mooring and breasting dolphins, and the magnitude, position and direction of major lateral loads to be safely

	accommodated by the jetty mooring and breasting dolphin structures and fender piles. • The geophysical, environmental and metocean conditions and ABP's and end users' functional, operational and maintenance requirements also informed the magnitude, position and direction of lateral and vertical loads to be safely accommodated by all jetty structures and the selection of materials and structural arrangements to maximise durability and minimise maintenance. • The bathymetry, tidal conditions and nature and capacity of the ground conditions at the site informed the sizes and lengths of piles supporting all jetty structures. • Safety, constructability and construction programme matters and the need to minimise working over water informed the selection of the proposed structural concept of reinforced concrete ("RC") decks (comprising of precast RC and/or precast prestressed RC elements stitched together with *in situ* RC stitches) supported by driven tubular steel piles. • The selection of the proposed approach jetty alignment and span length was informed by hydrodynamic modelling and the requirement to reduce inter-tidal habitat loss as much as possible. • The location of AW's outfalls and the IOT jetty, and the requirement to provide a minimum clearance to the outfalls and the IOT jetty informed the nearshore location of the approach jetty. • The location of the jetty access road landward of the flood defence informed the nearshore location of the approach jetty. • EA's requirements for vehicular access for the inspection, maintenance and emergency repair of the flood defence informed the location and arrangement of the EA access ramp onto the flood

	defence, its interface with the ramp for the approach jetty and the gradient of the ramp for the approach jetty. • The EA's requirements for future flood resilience and pedestrian access beneath the approach jetty informed the flood wall crest raising to +7.0mAOD directly beneath the approach jetty and the minimum soffit level of the approach jetty deck as it passes over the flood defence. • The need to minimise impact on trees with Tree Preservation Orders ("TPOs") in the Long Strip woodland, in particular veteran trees, and provide ABP and end users with sufficient space within the Operations Building with a uninterrupted view of the jetty head informed the decision to relocate the Operations Building from its original location at a lower level behind the flood defence onto the approach jetty, thereby safeguarding and protecting the highest value tree in the Long Strip woodland: a veteran ash tree located in the north-east corner of the woodland close to the flood defence. ***The hydrogen production facility (Work Nos. 3, 4, 5, 6 and 7)*** The design of the hydrogen production facility follows a design process that is used throughout the chemical/gases process industry and which is not dissimilar to the RIBA staged approach discussed above. The process principally comprises of four key steps which are detailed below: *Step 1: Basis of design and definition of requirements and constraints* A basis for the design and the definition of requirements and constraints was established and agreed at the outset which included:

	• Defining requirements, including requirements relating to capacity, product specification and reliability • Setting out design specifications to be followed such as the work processes, information requirements and general equipment requirements • Identifying applicable industry codes and standards – for example, design codes for tanks – and Best Available Technique ("BAT") documents • Identifying environmental issues or constraints and sensitive receptors, including assessing necessary data • Identifying regulatory permits and other requirements • Reviewing Health and Safety Executive ("HSE") Control of Major Accidents and Hazards ("COMAH") engineering guides and requirements • Assessing external interfaces and utility availability such as surface water run off rates (agreed with the IDB), water connection points and rates (through discussion with AW), electrical connections points and voltages (through discussion with Northern Powergrid) • Collecting appropriate initial desktop studies such as ground investigation data *Step 2: Concept design and option selection* At the concept design phase, work was undertaken to establish and review design options and identify the most suitable option in respect of meeting project requirements. This included work to select specific equipment types and configurations, seeking and responding to feedback where applicable from regulators, including the EA and HSE.

	The most effective arrangement of process units and supporting infrastructure (at concept level) from a safety, environmental, process safety and cost perspective was identified. For example, consideration was given to locating hazardous substances as far as possible from residential or other sensitive receptors. *Step 3: Basic engineering phase* The basic engineering phase develops the concept design that emerges through Step 2. Preliminary process engineering calculations establish equipment and process sizes and duties, from which preliminary equipment specifications and a 3D model is developed. Key safety, constructability and operability assessments were then undertaken either internally or with external specialist consultants and the outcomes incorporated. A value engineering study was then conducted to ensure the design was cost effective and fit for purpose. The basic engineering phase design was reviewed at various stages by the Project team, by the Air Products Chief Engineer's office (which is external to the Project team), and, at high level, by the relevant consultees as detailed in the **Consultation Report [APP-022]** to ensure consultee comments and views and project design requirements were appropriately taken into account. At this stage, the broad distribution of equipment and work areas, as defined in **Schedule 1** of the **draft DCO [PDA-004]** and on the **Works Plans [AS-002]**, and key maximum parameters were established as set out in **Requirement 4** in Schedule 2 of the **draft DCO [PDA-004]**. Key project strategies are established in this step defining requirements to be incorporated into the detailed design phase (Step 4 below). These

	typically include drainage, landscaping, and security, as well as engineering disciplines (electrical, control systems, etc). The Project as applied for reflects, as necessary, the work undertaken during Step 3. *Step 4: Detailed design phase* At the end of Step 3, the basic design is fixed and design strategies finalised, enabling the design to then be taken into the detailed design phase. During the detailed design phase, detailed equipment and process specifications will be developed for all elements of the hydrogen production facility. Equipment and materials will be purchased and vendor data (such as exact dimensions, utility and process connection details, etc.) from selected vendors will be built into the design. Detailed pipe and cable requirements will be developed in the 3D model. Further design, safety and operability reviews will be conducted at key stages through the detailed design process and the outcomes incorporated into the design. At the end of the detailed design phase, full construction drawings will be issued. During the detailed design phase, numerous reviews of the design and design documents will be held by the Project team and, as required by regulations, by external bodies such as HSE and EA (in relation to the COMAH Regulations 2015 and Environmental Permit process) and the Pressure Safety Systems Regulations 2000 notified body. The detailed design process will also take account, as necessary, of any design related requirements that form part of any made DCO.

	Professional expertise and local knowledge The design of Work Nos. 5 and 7, including the layout of the hydrogen production units, liquefiers and supporting utilities, has been conducted using Air Products' engineering professionals, supported by competent engineering contractors and sub-contractors selected and approved by industry standard procurement processes. Air Products has over 70 years' experience of designing, building, maintaining and operating similar facilities worldwide and Air Products' engineering professionals are industry experts in their engineering disciplines. These include civils design, mechanical design, process design, process safety and environmental professionals who demonstrate competence though accreditation by professional engineering institutions and ongoing professional development including Air Products' internal training. In each discipline, there is an approval process where senior level engineering discipline experts review and approve discipline engineering inputs. A review was also carried out by the Air Products Chief Engineer's office (the competent technical authority). The design of Work No. 3 (ammonia storage) has been conducted using two international engineering contractors (Bechtel and Saipem) who are specialists in the design and construction of similar, large, cryogenic tanks. The design of the jetty topside ammonia facilities and pipelines has been conducted by a local engineering consultant (OLG Engineering). In all cases, the engineers leading the work were experienced accredited professionals with extensive experience in similar projects. In addition to in house verification of competence, the competent authorities under COMAH, Pressure Systems Safety Regulations and

	other regulations require verification of the competency of engineering staff. During the concept and basic engineering phases, a number of key studies (some of which remain confidential) were also conducted either using in house expertise or using third party specialist consultants. These included: - Site geotechnical and topographic ground investigation studies (external consultant – AECOM) - Environmental studies across a wide range of topics including noise and vibration, air quality, landscape and visual, biodiversity, ground investigations, climate change and flood risk (external consultant – AECOM) - Hazard Identification and Hazard and Operability ("HAZOP") process safety studies (chair independent to Project team) - Toxic release and blast studies (external consultants DNV, Baker Risk and Gexcon) - BAT studies for the tank (external consultants Bechtel and Saipem) - External design review by Air Products Chief Engineers Office (independent to the Air Products identified Project team) *Design evolution* Throughout the design process identified above, the design has evolved and matured leading to the finalisation of lateral parameters as defined in the **Work Plans [AS-002]** and the other key parameters identified in **Requirement 4** in Schedule 2 of the **draft DCO [PDA-004]**. **Section 1.5** of **Appendix G** to the **Planning Statement [APP-233]** summarises how the design of the landside infrastructure evolved

	throughout the pre-application process as a result of greater knowledge of site constraints, obtained through a combination of surveys, environmental assessment and feedback obtained from two rounds of statutory consultation and ongoing engagement. Changes made and consulted upon during the second statutory consultation included an amended drainage design in relation to changes to the layout of the West Site and the temporary diversion (rather than closure) of Bridleway 36 during construction of the Project. In addition, as an outcome of the layout, constructability and value engineering reviews conducted during the basic engineering phase (Step 3 above), the layout of the overall Project and the phasing of construction has evolved to keep all work in Phases 1 and 2 in Work Nos. 3 and 7, leaving Work No. 5 largely free for a temporary construction compound during Phase 1, as stated in **ES Chapter 2: The Project [APP-044]**. Design evolution is also demonstrated by the following: • Following agreement with the Internal Drainage Board (IDB) on the maximum discharge rate of surface water from Work Nos. 3, 5 and 7 and consequently the volume of water retention which was required, the design was adjusted to increase the Finished Grade Level in Work Nos. 3, 5 and 7 by importing gravel fill material (see **ES Appendix 18.B: Drainage Strategy [APP-210]**). This is reflected in the parameters given in **Requirement 4** in Schedule 2 of the **draft DCO [PDA-004]**. • Following a safety study, the number of ammonia pumps in Work No. 3 and the associated number of tank wall penetrations was reduced. This reduces the risk of leaks and reduces the amount of external piping and space requirements.

	• Following safety and operability reviews, the design of Work No. 3 was revised to include two ammonia vapour recovery compressors (each 100% of normal duty) and an emergency generator such that flaring of ammonia vapour was not required in the event of power outage or compressor breakdown, affecting design and layout. • Due to the potential risk of a sea wall breach and subsequent flooding, the design was adapted to elevate key equipment around the ammonia tank or protect it with the bund wall, such that the ammonia tank remained safe and operational under such a flooding scenario. • Following safety reviews, the size of pipelines from the jetty head to the tank was reduced and extra midpoint shutdown valves added to reduce the maximum inventory and consequence in the event of a leak, affecting design and layout. • Following safety review, the pressure of ammonia in the underground pipelines (Work No. 6) was reduced (and additional pumps added in Work No. 7 to compensate), affecting design and layout. • Due to the availability of non-potable water in Laporte Road, an additional pipeline was added (Work No. 6) to transfer the water to the cooling towers in Work No. 7. In addition to the operational elements, the design also evolved to include opportunities for landscape and biodiversity measures, as set out in the **Outline Landscape and Ecology Management Plan [APP-225]**. As shown on **Figure 1** of that document, there are opportunities for landscape and biodiversity areas in the area where the ammonia tank (Work No. 3) and the hydrogen production facility (Work Nos. 5 and 7) would be sited. These landscaped areas would comprise amenity and species rich grassland, tree and shrub planting and hedgerow. The

	measures set out in the **Outline Landscape and Ecology Management Plan [APP-225]** demonstrate good design, to the extent possible, relative to existing landscape character, landform and vegetation, in accordance with Paragraph 4.10.3 of the NPSfP. **b) Were different designs considered for different components of the Proposed Development? Set out the reasons why you favoured the choice that you have selected, highlighting where operational, safety and security requirements influenced your decision-making.** ***Summary of response to part b) of the question*** Different designs were considered for each element of the Project. As well as decisions being informed by operational and technical requirements, environmental considerations were also key, particularly in relation to the jetty and jetty access road where the Applicant sought to minimise impacts to intertidal habitats and the Long Strip Woodland. ***The jetty and jetty access road (Work Nos. 1, 1a and 2)*** Based on the available information on ground conditions and environmental data and in keeping with the approach taken on other jetties within the Port of Immingham, the concept design selected for all jetty structures comprised RC decks (comprising of precast RC and/or precast prestressed RC elements stitched together and infilled with *in situ* RC stitches) supported by driven tubular steel piles. The selection of this concept was also based on its proven track record and the previous experience of ABP, Ramboll and Jacobs in respect of similar projects within the Port of Immingham and other recent jetty projects elsewhere. Considering the suitability of this concept required a consideration of the conditions at the Project location and various

	operational, technical, safety and environmental requirements, including in relation to the following: • Suitability to the variable water depths at the Project location, initially shallow and increasing in depth to much deeper water depth further offshore • Suitability to the ground conditions at the Project location which permit pile installation by conventional driving methods yet providing sufficient resistance to support anticipated pile loads with minimal long-term settlement • Minimising inter-tidal direct and indirect habitat loss, and interference with the hydraulic regime and wave reflection • Maximising safety, constructability and minimising working over open water • Maximising span length between pile supports • Maximising speed of construction and hence minimising construction programme duration, and associated environmental impact during construction • Maximising use of floating plant with heavy lifting capacity and providing options to work on multiple work front locations along the jetty • Minimising the use of *in situ* concrete offshore • Maximising strength, robustness, reliability, operability and functional and operational flexibility • Maximising structural integrity, quality, design service life and durability through careful selection of materials, rigorous quality control of the precast unit manufacturing processes, implementation of corrosion protection strategies for the steel piles and/or including sufficient allowance for sacrificial corrosion of the

	steel, adopting best practice design and adherence to current codes of practice • Minimising whole life maintenance and operational downtime Based on the selected concept, several combinations of pile numbers, pile spacing and pile section sizes meeting the Project objectives (as described in **ES Chapter 3: Need and Alternatives [APP-045]**) were considered. Each was investigated with respect to project functional and operational requirements, spatial requirements, load magnitude, position and direction, and structural displacement requirements and each option was assessed against the Project objectives. The response to part (a) of the question provides a description of some of the factors that informed the evolution and development of the concept design of the jetty structures. Modelling of direct and indirect habitat loss (**ES Chapter 16: Physical Processes** [APP-058]) was undertaken to identify the habitat loss for each alternative option. Alternative options that resulted in a greater impact than the Project were discounted. Where environmental effects were the same for different options, the Project adopted the preferred technically feasible solutions. These alternatives are listed in **Table 1** in the **Without Prejudice Report to inform Habitats Regulations Assessment Derogation [APP-235]**. As explained in **Paragraphs 3.9.11 to 3.9.21** of **ES Chapter 3 [APP-045]** different design options were considered for the jetty access road. The identification of the preferred solution took account of various matters including: • Impacts on Long Strip woodland • Impacts on habitat fragmentation

	• Impacts on surrounding uses and third party land • Impacts on the intertidal zone • Impacts on the public bridleway The option chosen was considered to have the least impact with regard to third-party land, habitat fragmentation, diverting public bridleway 36 off Laporte Road and the impact on the intertidal habitat loss. In order to reduce the impact on the Long Strip woodland, the alignment chosen was aligned to run to the west of the Long Strip woodland before cutting into the Long Strip woodland just before APT's land to reduce the impact on the TPO. ***The hydrogen production facility (Work Nos. 3, 4, 5, 6 and 7)*** Operational and technical (regulatory and safety) requirements were key considerations in design decision-making relating to the hydrogen production facility due to the nature of the end use. One example where, during the concept design phase, different design options were considered and evaluated prior to final selection is the selection of the type of tank for the ammonia storage. Two separate specialist tank engineering companies conducted a BAT study on tank type and independently evaluated the following tank designs: • Single-wall steel tanks with external insulation • Double containment ('tank in cup'), steel tanks with double walls: the steel inner tank is housed within another steel tank to contain the full contents of the tank, with a single roof • Double containment ('tank in cup'), steel tank surrounded by a concrete wall with capacity to contain the full contents of the tank and the space between the tank and the concrete wall having an impervious floor and vented roof covering the annular space

	• Full containment steel cup in steel tank • Full double containment (tank-in-tank) – not covered by relevant design codes The evaluation of the designs included consideration of codes and standards, regulations and HSE guidance, risk matters (including blast risk), tank material selection, insulation system, piping penetration, pumps configuration, inspection/maintenance, site layout/spacing criteria, construction constraints and schedule/cost. Evaluation criteria were weighted to give higher weightings to more critical areas such as safety. The evaluation also included consultation with the HSE. Both studies recommended the tank in cup with a concrete outer wall design for safety and operability reasons. Other aspects of the technical design of the hydrogen production facility underwent similar concept evaluation prior to the selection of a design type. **c) What are your overarching design principles that have driven detailed design process so far and would drive it forward during Examination and post consent (should consent be granted)?** ***Summary of response to part c) of the question*** The overarching design principles that have driven the Project forward thus far and would drive it forward in later stages relate to the need to comply with operational, technical and environmental requirements and matters. As already explained, in respect of aesthetics and matters relating to the visual appearance of the Project, where there remains some flexibility in what can be provided, the **draft DCO [PDA-004]**

	includes the ability for the detail of such matters to be subsequently approved by NELC as necessary. At a high level, the overarching design principles that have driven the design process for the Project can, therefore, be summarised as: 1. Meeting operational requirements – matters relating to ensuring that the Project is able to be operated for the purposes envisaged, i.e. does it do what it needs to do? 2. Meeting technical requirements – matters relating to ensuring that the Project is able to meet necessary safety and regulatory requirements 3. Taking account of environmental requirements and matters – matters and requirements over and above those already considered in 1. and 2. which seek to minimise the adverse environmental impacts of the Project, including matters relating to landscape and visual impacts and the impacts of the Project on designated sites. Hence the process involves meeting the operational and technical requirements (items 1 and 2 above) whilst taking account of environmental matters (item 3 above) as far as possible and utilising good engineering practice to produce a design with due skill, care and diligence to meet the needs of the Project. ***The jetty and jetty access road (Work No. 1, No. 1a and 2)*** Examples of how the above design principles have influenced the design of the jetty and the jetty access road include:

	• The Terminal will form a new boundary for the port and the site will need to follow the International Ship and Port Facility Security ("ISPS") code and general port security standards. These requirements have been captured in the design at RIBA Stage 2 and specifications drafted to ensure key outcomes are achieved during procurement. • Use of the environmental assessment process to ensure environmental requirements and matters – including the need to minimise impacts on designated sites and matters relating to the visual appearance of the Project – remain a key part of design decision making. • Ensuring the integrity of the present and future flood defence, which the jetty passes over, has influenced detailed design in this area. • Marine navigational impact considerations have driven feasibility design and those key constraints will continue to have an influence throughout the design development. • The footprint of the jetty head structure is driven by the need to provide space for the required topside operations and maintenance of equipment and the loads applied by moored and berthing vessels, and this approach will continue through detailed design. • The jetty approach design is driven by the weight of the structures it is required to support, the provision of a stable, stiff foundation to the topside equipment and buildings, the maintenance requirements for a structure of significant length over water and safe vehicular access for operation and maintenance.

	• The access road design is driven by the alignment requirements to minimise impact on the tree protection zone and provide a safe alignment for vehicular access for operation and maintenance. ***The hydrogen production facility (Work Nos. 3, 4, 5, 6 and 7)*** Examples of how the above design principles have driven the design of the hydrogen production facility include: • The size, height, shape and materials used in the construction of the hydrogen production units is driven by capacity requirements, flow rates, internal tube lengths, gas residence time and other relevant process conditions that lead to a design of a certain size and form. • Maintenance and operability requirements dictate layout and spacing including access platforms, walkways including site access roads and pedestrian walkways. • Use of the environmental assessment process to ensure that environmental requirements and matters remained a part of the design decision making process as appropriate. • Flue and flare stack heights are determined by emission rates and dispersion calculations. • Size of buildings/shelters for equipment and the material used in construction is determined by the equipment within them, noise attenuation requirements, maintenance access and blast resistance requirements amongst other things. Certain non-process buildings have been identified where there can be a choice of materials.

	• Size and material of construction/appearance of the ammonia tank is driven by required capacity and tank selection criteria, whilst external finish is identified as a matter for further consideration. • Flood risk considerations (sea wall overtopping) dictate that certain critical equipment in the ammonia storage area (Work No. 3) must be set at an increased elevation or protected by bund walls. • Project requirements to minimise utility consumption drive the process design to maximise efficiency and heat integration, leading to a design which is as sustainable as possible. • The external appearance of process structures (for example steel work, piping, insulations, cable tray) is driven by Project requirements for paint and corrosion systems, insulation and cladding. Heights and elevations are driven by process design and operability requirements. • Security requirements dictate external fencing specification and constraints on the provision of any landscaping close to the fencing which may affect security. • Requirements for road tanker access/parking, maintenance access, drainage/gravelled areas dictate overall site layout and available space for landscaping/non-process use. • The desire to provide low level characteristic landscape features along road frontages to provide filtering of views of the built structures at ground level and introduce landscaping and ecological measures into the site as far as possible led to the production of the **Outline Landscape and Ecology Management Plan [APP-225]** secured through Requirement 10 in Schedule 2 of the draft DCO. • The need to comply with other regulatory regimes such as the COMAH Regulations and the environmental permitting regime.

	As indicated at the outset of this answer, where aspects of the design are able to be driven by design principles other than those indicated above (i.e. are not driven by safety, operability, codes/standards, project requirements or other regulatory regimes), then the involvement and approval of the local planning authority will be obtained. **d) In line with the NPSfP, the demonstrate how the ExA and the SoS can be satisfied that your proposed overarching design principles would deliver the following NPSfP policy requirements:** • **high quality and inclusive design;** • **functionality, fitness for purpose and sustainability;** • **sensitivity to place that demonstrates good design relative to existing landscape character, landform and vegetation;** • **efficient in the use of natural resources and energy used in construction and operation;** • **appearance that demonstrates good aesthetic;** • **use of appropriate technologies can help mitigate adverse impacts;** • **sustainably designed having regard to regulatory and other constraints; and** • **taking account of natural hazards such as flooding.** The Applicant's overarching understanding of the design related requirements set out within the NPSfP is detailed within the 'Introduction and overview' section of this answer to the ExA's question. The Applicant's position in respect of the specific matters listed in this part of the question is summarised in the following table.

	Question Reference	Project position
	High quality and inclusive design	The Applicant notes that the term 'high quality and inclusive design' is only used in Paragraph 4.10.1 of the NPSfP as part of an explanation that such good design goes far beyond just aesthetic considerations and as part of the general introduction to the topic within the policy. Demonstrating compliance with the specific policy aspects that then follow in Section 4.10 of the NPSfP (which is demonstrated below) shows that the Project is of a high quality and inclusive design. **Jetty and the jetty access road** The design of the jetty has been undertaken by an experienced and competent design team. Throughout the design process there has been stakeholder engagement, both internally in ABP and with the future end users to understand the needs of future users of the facility. The Project has also sought to ensure that the buildings are designed to be inclusive and to meet the operational and functional requirements for those buildings on-site and to limit adverse environmental impacts as far as possible. On the jetty head and the operations building, welfare provisions have been made, including a mooring shelter for the mooring team to shelter during inclement weather.

		Hydrogen production facility Specification of permanently occupied buildings include requirements for inclusive design with regard to access and building facilities, in accordance with Project requirements, and include toxic shelters and flood refuge. The Project has also sought to ensure that the buildings are designed to be inclusive where reasonably practicable, whilst still meeting the operational and functional requirements for the buildings on site. In terms of quality of design, the Applicant's answer to Q1.4.1.2 as a whole demonstrates those requirements against which the design of the whole Project has been undertaken and explains why, in respect of these requirements, the design of the Project is of high quality. The application of all three overarching design principles identified in response to part c) of the question have resulted in, and will continue to ensure, a high quality and inclusive design.

	Functionality, fitness for purpose and sustainability	The NPSfP makes clear (at Paragraph 4.10.3) that these are elements which the decision maker should be satisfied that the Applicant has taken into account as far as possible. In this respect, the policy makes it clear that matters relating to fitness for purpose and sustainability (a matter explained further in the Introduction and overview section of the answer to this question) are, in effect, elements which demonstrate functionality. In addition, consideration of these matters plays a role in demonstrating that the Project is as attractive, durable and adaptable as it can be and that it constitutes high quality design as port infrastructure. **Jetty and jetty access road** The jetty and jetty access road have been designed with due skill, care and diligence to meet the Project's operational and functional requirements and this has included consideration of sustainability aspects including the minimisation and mitigation of environmental impact. The proposed jetty design of a concrete deck on piles provides further opportunity to improve the sustainability of the design through specification for low carbon concrete, increase use of prefabricated/precast elements to reduce time spent on site and material use. Collaboration between the Environmental Impact Assessment team and the design team was ongoing

		during the application preparation process. Any required mitigation measures were duly included in the design. The footprint of the jetty access road has been designed to reduce tree loss, include a resilient drainage design for the 100-year flood event +40% climate change allowance, and incorporate low footprint flood attenuation measures. **Hydrogen production facility** The Project requirements and the design, technical, safety and operability reviews inherent in the design process have generated a design that is functional, fit for purpose and sustainable. The hydrogen production facility is an industrial facility, and its overall appearance is unavoidably industrial in nature, as this is driven by operational and technical requirements for process plant and equipment. The surrounding area is, as already highlighted, also industrial in nature with the Project proposed to be located partly within and partly adjacent to the Port of Immingham, and with industrial neighbours such as the Knauf facility and IOT facility in close proximity. The application of all three overarching design principles identified in response to part c) of the question have resulted in, and will continue to ensure, a Project that is fit for purpose and sustainable.

	Sensitivity to place that demonstrates good design relative to existing landscape character, landform and vegetation	The Applicant understands that this element of the question combines two parts of Section 4.10 of the NPSfP. In terms of existing landscape character, landform and vegetation, the Project is proposed to be located in and adjacent to the Port of Immingham within an area that is industrial in nature, being dominated by port infrastructure, chemical manufacturing, oil processing and power generation facilities. It is a location that is well-suited to accommodate a development that is necessarily entirely industrial in its character and appearance. The jetty will be well integrated into the character and landform of this part of the Humber Estuary. This part of the south bank of the Humber is dominated by port infrastructure of a similar character to that which is to be provided by the Project. This includes the adjacent IOT liquid bulk handling jetty, the eastern and western jetties that delineate the entrance into the Immingham enclosed dock complex, the Immingham Outer Harbour facilities, the Immingham Bulk Terminal, the Humber International Terminal and the Immingham gas jetty. Further to the north of these existing marine structures and facilities it is also noted that a significant new straightline quay – forming part of the Able Marine Energy Park – has consent. These marine facilities are all, in turn, supported by landside supporting infrastructure, a relationship that is

		similar to that which will be created by the Project in terms of the relationship between the marine infrastructure and the hydrogen production facility. Other industrial and energy related developments exist, or are proposed to be constructed, around the site of the hydrogen production facility further contributing to the industrialised character of the overall surroundings within which the Project will be located. The jetty access road has been designed taking into account tree loss and the impact on other existing features such as drainage ditches. Impacts on the existing landscape/environment have been minimised. The public use of rights of way has been sensitively managed by maintaining the existing bridleway. The **Outline Landscape and Ecology Management Plan [APP-225]** sets out measures that help to integrate the hydrogen production facility into the existing industrial area. The application of all three overarching design principles identified in response to part c) of the question have resulted in, and will continue to ensure, a Project that is sensitive to the place in which it is to be located as far as this is possible and which demonstrates good design relative to existing landscape character, landform and vegetation.

	Efficient in the use of natural resources and energy used in construction and operation	The Applicant understands that this matter arises out of the text in Paragraph 4.10.1 of the NPSfP. Whilst these matters have been touched on in the 'Introduction and overview' section of this answer in the context of Paragraph 3.3.3 of the NPSfP and the information contained in **Appendix A** of the **Planning Statement [APP-227]**, the following further explanation is provided. **Jetty and jetty access road** The design has been based on a standard and robust form of construction, which would allow for low future maintenance and the use of standard construction practices. The use of a suspended deck on piles solution versus a gravity or rubble mound solution is a more efficient use of materials to provide the working platform required for operation. The suspended deck solution lends itself to development of further efficiencies using off-site/precast construction which would limit the number of transport movements on site and provide an opportunity for river-based transport of precast/prefabricated elements. The original layout, which included a two berth solution, was optimised to a one berth solution through consultation with stakeholders and a review of the safety requirements for such an operation, noting that there would never be simultaneous offloading/loading, and consideration of the fit of the range of vessels proposing to use the facility.

		The layout and design of the jetty access road has sought to reduce natural resource use and energy consumption in construction and operation. For example, removing the need for piles on the jetty ramp to reduce construction impact or maintaining the ability for flowing traffic to reduce idle waiting, such as through the provision of the roundabout and maintaining passing traffic widths where possible. **Hydrogen production facility** The requirement to meet carbon intensity thresholds for the end green hydrogen product, set by legislation and standards, and the requirement for the operating process to demonstrate BAT for the environmental permit drives energy efficiency within the ongoing design of the operating facility. Examples are the use of heat exchangers to capture and reuse waste heat and 'tail gas' within the hydrogen production unit and reduce energy input, selection of efficient machinery and selection of efficient insulation materials for the liquefier. The application of all three overarching design principles identified in response to part c) of the question have resulted in, and will continue to ensure, a Project that will be efficient in the use of natural resources and energy used in construction and operation.

	Appearance that demonstrates good aesthetic	The Applicant understands that this part of the question arises out of the text in Paragraphs 4.10.1 and 4.10.3 of the NPSfP. **Jetty and jetty access road** The proposed jetty design solution of a suspended deck on piles – which meets operational and technical requirements – is considered to result in an aesthetically appropriate design solution. Having regard to the operational purpose of the infrastructure being provided, the location and environment in which it is to be located and the surrounding visual context (which includes numerous other elements of marine infrastructure similar in appearance) the jetty infrastructure is considered to demonstrate good aesthetics as far as it is possible for a development of this specific type. In respect of the jetty access road, the design that has been determined has had due regard to the character of the site and surroundings, including topography and landform. It has to be accepted, however, that there are limits to what can be achieved in terms of the aesthetics of an access road due to its proposed functional requirements. **Hydrogen production facility** Where the appearance of the hydrogen production facility is not driven by operational or technical requirements and where design flexibility remains, these details have been left open for subsequent

		approval by the local planning authority, thereby ensuring that the Project is as attractive as it can be. The application of all three overarching design principles identified in response to part c) of the question have resulted in, and will continue to ensure, a Project which demonstrates good aesthetics as far as possible.
	Use of appropriate technologies can help mitigate adverse impacts	The Applicant understands that this element of the question arises out of the text provided in Paragraph 4.10.2 of the NPSfP. The Applicant is aware that the ExA have asked a specific question (Q1.4.1.1) on this matter, and the Applicant directs the ExA to the answer it has given to that question.

	Sustainably designed, having regard to regulatory and other constraints	The Applicant understands that this element of the question arises from Paragraph 4.10.3 of the NPSfP. Matters relating to sustainability have already been highlighted elsewhere in this overall answer being provided to Q1.4.1.2. **Jetty and jetty access road** The jetty structure has been designed to RIBA Stage 2 with sustainability considerations forming an important part of that process. The design has considered sustainability aspects such as environmental impact and the mitigation of impacts. The choice of a suspended deck on piles reduces the impact on the seabed compared to other solutions and provides the opportunity for further optimisation through the specification for low carbon concrete where possible. The design has been undertaken in parallel and in collaboration with the Environmental Impact Assessment allowing for ongoing assessment and mitigation of impacts in the design. The Applicant has also had regard to stakeholder feedback, obtained through two rounds of statutory consultation, as summarised in the **Consultation Report [APP-022]**. **Hydrogen production facility** As already indicated, the design of the hydrogen production facility is required to comply with the requirements of other regulatory regimes including under COMAH and Environmental Permitting. In addition, **Paragraphs 7.2.6 to 7.2.11** of the **Planning**

		Statement [APP-226] set out an indication of the sustainability measures that are proposed in the construction and operation of the Project. As with the jetty and jetty access road, the design of the hydrogen production facility has been undertaken in parallel with and in collaboration with the Environmental Impact Assessment allowing for ongoing assessment and mitigation of impacts in the design. The Applicant has also had regard to stakeholder feedback, obtained through two rounds of statutory consultation, as summarised in the **Consultation Report [APP-022]**. The application of all three overarching design principles identified in response to part c) of the question have resulted in, and will continue to ensure, a Project that is sustainably designed, having regard to regulatory and other constraints.
	Taking account of natural hazards such as flooding	The Applicant understands that this element of the question arises out of text in Paragraph 4.10.3 of the NPSfP. **Jetty and jetty access road** The deck level of the structure is set above a predicted future flood level, with allowance for waves and climate change. The impact of very low probability seismic events and industry standard allowances for extreme weather have also been considered and taken account of as necessary in the design.

		The drainage strategy for the jetty access road has considered the risk of flooding to industry guidelines, such as the 100-year rainfall event including a 40% climate change allowance. The surface water run-off will be restricted to a rate that will not create an impact on downstream flooding. **Hydrogen production facility** **ES Appendix 18.B: Drainage Strategy [APP-210]** incorporates sufficient water retention within the design such that in a 100-year rainfall event, including a 40% climate change allowance, the surface water run-off will be restricted to the current run-off rate in that site area. The design of the ammonia storage area will incorporate provisions (elevation or bunding of critical equipment) such that in the event of sea wall breach flooding, the tank and associated process units will continue to operate safely. The application of all three overarching design principles identified in response to part c) of the question have resulted in, and will continue to ensure, a Project design that takes account, as appropriate of natural hazards.

	e) Set out the main stages of the remainder of the design process (marine and landside) required to fully develop the design of the Proposed Development during Examination, and post consent (should consent be granted). ***Marine-side design process (Work Nos. 1, 1a and 2)*** As already explained, for these elements, at the time of the DCO submission a RIBA Stage 2 Concept Design was complete. Since DCO submission, the design has been further developed into RIBA Stage 3, Spatial Coordination, which has taken the Project up to Examination. The contractor procurement phase will occur during the Examination, which will slow down design development but will allow a contractor to come onboard the Project and help deliver RIBA Stage 3 to completion having had the chance to input into this phase with greater detail on the constructability requirements. This will align with the later stages of Examination. Following this, RIBA Stage 4, Technical Detail, will commence where final detailed design will be completed to allow supply chain engagement. Whilst the further detailed design process will, as necessary, be undertaken in parallel with the DCO Examination it will be undertaken within the scope and parameters of the Project for which DCO consent has been applied. Such further design work is not, therefore, intended (or indeed expected) to affect the overall design of the Project for which consent is sought. ***Landside design process (Work Nos. 3, 4, 5, 6, 7)*** The landside design is currently generally at the end of the Basic Engineering design phase (Step 3 as outlined in part a) to this question) and is moving into the Detailed Engineering and procurement phase. Key

	design selections have been confirmed, design strategies and requirements set and preliminary safety and operability reviews completed. In the detailed design and procurement phase, detailed equipment specifications will be finalised and equipment purchased. This will deliver vendor data which can be incorporated into the design. The design of larger, layout-dictating items (such as equipment, module design, large bore piping, major foundations) will be progressively frozen whilst design of other items continues (such as smaller piping, control systems, cable routes). Other aspects of the design will be finalised, including the following: • Detailed design of facility lighting will be developed, and the operational lighting design approved by the local planning authority. • Once equipment has been purchased and vendor data is available an operational noise plan will be developed and noise mitigation measures finalised. **f) Explain how the principles driving the design of the Proposed Development are secured in the dDCO** As set out in part c) to this question, the design principles embedded in the Project relate to operational, technical and environmental requirements and matters. It is the Project that has emerged from the design process driven by these principles that is then reflected in the parameters, as detailed below, which are secured in the **Works Plans [AS-002]** and through Requirements in Schedule 2 of the **draft DCO [PDA-004]**. ***Lateral parameters***

	The lateral parameters for each element of the Project comprise the boundary for each of the defined work areas as set out in the **Works Plans [AS-002]** and defined in **Schedule 1** of the **draft DCO [PDA-004]**. The alignment of the jetty, which forms the main component of the Terminal (Work No. 1), is defined on the marine side within relatively narrow parameters (Work No. 1a) because the design of the jetty has been developed such that it minimises the impacts on the intertidal habitats of the Humber and modelling indicates that there is relatively little tolerance in the possible alignment. For the hydrogen production facility, the spatial extent of the largest components is defined on the **Works Plans [AS-002]**. For instance, the location of the ammonia storage tank can only take place within the area defined as Work No. 3a, rather than anywhere within Work No. 3 as a whole. This is in order to provide a controlled level of flexibility for the Project during the detailed design stage. ***Vertical parameters*** The vertical parameters for the jetty (Work No. 1a) are defined in **Table 2-1** in **ES Chapter 2: The Project [APP-044]** and secured by the Deemed Marine Licence under **Condition 8: Construction Environmental Management Plan** within **Schedule 3** of the **draft DCO [PDA-004]**. The vertical parameters for the jetty access road (Work No. 2) are defined in **Table 2-2** in **ES Chapter 2: The Project [APP-044]** and secured under **Requirement 4: Detailed Approval** and **Requirement 6: Construction Environmental Management Plan** within **Schedule 2** of the **draft DCO [PDA-004]**.

	Vertical parameters for the hydrogen production facility are defined within **Table 1** of **Requirement 4: Detailed Approval** within **Schedule 2** of the **draft DCO [PDA-004]**. The table sets out the maximum heights and finished ground levels for the permanent build elements identified within the specific work areas. ***Additional parameters*** Work No. 1a is defined further by additional parameters in **Table 2-1** in **ES Chapter 2: The Project [APP-044]** such as maximum pile number and maximum pile size, which are secured by the Deemed Marine Licence which forms **Schedule 3** of the **draft DCO [PDA-004]**. ***Detailed design*** In finalising the design of the hydrogen production facility within the parameters set out above, many aspects of compliance with design principles 1 (meeting operational requirements), 2 (meeting technical requirements) and 3 (taking account of environmental requirements and matters) will need to be secured through separate regulatory regimes. In particular, the facility will have to comply with the requirements of the COMAH Regulations 2015 (where the competent authority is both the HSE and the EA) and the environmental permit process (EA). Whilst Air Products will ensure that any detailed design that ultimately comes forward (within the scope and parameters set through the DCO process) meets operational and technical requirements, those separate regimes will control and secure key aspects of the detailed design. As acknowledged in the NPSfP (at Paragraph 4.11.3), the decision maker should recognise that these other processes exist and should proceed on the basis that they will be properly applied by the relevant body. A similar

	acknowledgement is given in the Overarching National Policy Statement for Energy (EN-1) – see for example paragraph 4.12.10. However, in addition to those parameters which give flexibility to the extent required, **Schedule 2** of the **draft DCO [PDA-004]** – as has already been explained – sets out various Requirements which must be discharged by NELC as the local planning authority. These requirements relate principally to matters of relevance to those aspects of the final aesthetics and visual appearance of the Project which are not addressed by the separate regimes referred to above. The design principles that have been defined will be applied in the discharging of these requirements. For example, through **Requirement 4**, NELC will need to approve the external paint finish of the ammonia storage tank. Possible options may include a neutral or recessive colour as used on several similar storage tanks within the vicinity of the site. The use of neutral or recessive colours would enable the ammonia tank to be integrated with, rather than stand out from, the local landscape and visual context, thereby minimising its visual impact. The use of colours to minimise visual effects is recognised in Paragraph 5.11.17 of the NPSfP which indicates that effects "*may be minimised through appropriate siting of infrastructure within that site, design including colours and materials, and landscaping schemes…*"
Q1.4.1.3	
Question	**Response**

Design Assessment a) Do you agree with the assessments within the application [APP-226, Section 4.3] [APP-233] and are you satisfied that there is sufficient information contained within the application to secure design outcomes that would be compatible with the surrounding area should the Proposed Development be granted Development Consent? b) Are there Local Design Policies that would be important and relevant to the design outcomes of the Proposed Development? Explain how these have been taken into account by the Applicant in either the Design Evolution document [APP-233] or elsewhere in the Application? c) Applicant, may also respond.	While the question is primarily aimed at North East Lincolnshire Council ("NELC") and Natural England, the Applicant is also given the opportunity to respond as indicated by criterion c) of the question. **Response to Q1.4.1.3 (a)** It will be evident from the discussion at Issue Specific Hearing 2 ("ISH2") and in the response to Q1.4.1.2 that design options for the Project are largely dictated by operational and technical requirements, taking account of environmental requirements and matters as appropriate. Where detail – largely relating to aesthetics and visual detail – of certain parts of the development can be made subject to further subsequent detailed approval by NELC as local planning authority, this is the process that has been put forward to seek to ensure that, in line with policy within the NPSfP, the Project is as attractive as it can be. In terms of compatibility with the surrounding area, the Port of Immingham, the south Humber bank and indeed the outskirts of the town of Immingham incorporate various pieces of port, industrial and energy related infrastructure including a number of elements of large-scale industry. In this sense, the infrastructure of the Project is considered to be appropriate within the existing port and industrial landscape – fundamentally this is an industrial landscape and the site identified for the development is suitable for the purposes envisaged. This is a matter further explained within the Applicant's response to Q1.4.1.2. The Applicant is confident that it has provided sufficient information in the application documentation, not least **Planning Statement Appendices A, C and G [APP-227, APP-229 and APP-233]** to demonstrate accordance with the policy requirements on design.

The Applicant's evidence (including in its response to Q1.4.1.2) demonstrates that, in respect of the policy on 'good design' within the NPSfP, the Project is sustainably designed and is as attractive, durable and adaptable as it can be.

Response to Q1.4.1.3 (b)

In view of this specific question to NELC on design, the Applicant considers that it would be helpful to set out its position in respect of how the Project is consistent and conforms with the specific requirements of Local Plan Policy 22 – 'Good design in new developments', insofar as it is important and relevant to the ExA's consideration. This consideration is set out in the table below.

Local Plan Policy 22 Requirement	Demonstration of compliance/consistency
High standard of sustainable design	Set against this NPSfP policy context on design (which is referenced and considered in more detail in the Applicant's response to Q1.4.1.2, detail which is not repeated here), the Applicant has sought to develop a design for the Project which results in a high quality, sustainable, efficient and safe development appropriate to its context in a port and industrial environment. Whilst the Project reflects the real-word limitations placed on its design through operational and technical

		requirements, environmental requirements and matters, including those relating to aesthetics and visual appearance, have been taken into account and, where adverse effects have been identified, mitigatory proposals are incorporated into the Project design to minimise and address these.
	Design approach informed by a thorough consideration of the particular site's context (built and natural environment, and social and physical characteristics)	The design of the Project has evolved through its gestation in response to feedback from stakeholders and Interested Parties and to reflect the site context. That context is a location in and adjacent to the Port of Immingham within an area that is industrial in nature, being dominated by port infrastructure, chemical manufacturing, oil processing and power generation facilities. In addition to the existing context it should also be noted that the land on which the Project is proposed is allocated for employment development within an area where the type of activity proposed is within key employment sectors identified in the local plan. Furthermore, and in addition to existing development, there are further consented industrial projects of an industrial nature which will be developed in the coming years in the vicinity of the Project (see response to Q1.4.1.2). Options were considered to reflect the site context and to minimise adverse impacts in terms of changes to the jetty design and the design/route of the jetty access road to minimise impacts on the Long Strip. In terms of the hydrogen production facility, different plant layouts were reviewed to select the most effective from a

		technical, environmental and process safety view, for example to locate hazardous substance as far as possible from residential or sensitive receptors. To a substantial degree, and as acknowledged in Section 4.10 of the NPSfP, the end-design has to reflect operational and technical requirements including the safety requirements of associated regulatory regimes, but environmental requirements and matters (including visual impact) have been considered where possible (as explained in the response to Q1.4.1.2).
	The need to achieve the protection and enhancement of natural assets	The design of the Project has sought to protect and enhance natural assets through various measures, including: • Minimise operational and construction effects on the marine environment as identified in **Environmental Statement ("ES") Chapter 9: Nature Conservation (Marine Ecology) [**APP-051**]** • Minimise adverse impacts on Long Strip but also provide compensatory woodland planting through the **Outline Woodland Compensation Strategy ("WCS") [**APP-224**]** which will see an overall environmental enhancement through the planting of 1,980 trees as replacement for the 220 (0.64ha) to be lost through the construction of the jetty access road within part of Long Strip, alongside other ecological enhancements

		This level of replacement planting is more than double the number of trees required under NELC policy (**Paragraph 4.4.1** of the **Outline WCS**). These commitments are secured through Requirement 11 in Schedule 2 of the **draft Development Consent Order ("dDCO") [**PDA-004**]** and include a monitoring and maintenance regime over a 25-year period. The **Outline Construction Environmental Management Plan ("CEMP") [**APP-221**]** sets out the measures which will be taken to ensure the avoidance, minimisation and mitigation of adverse effects during the Project's construction. It incorporates a Register of Environmental Actions and Commitments ("REAC") for each environmental topic assessed in the **ES** and sets out the mitigation and management measures to be included as a minimum in the final CEMP. It also comprises an Impact Avoidance and Mitigation Measures Implementation Plan. These measures are secured through Requirement 6 in Schedule 2 of the **dDCO [**PDA-004**]**. The design has also sought to minimise impacts on wildlife. The **Outline Landscape and Ecology Management Plan [**APP-225**]** sets out a strategy for the establishment and future management of proposed landscape and ecological measures associated with the main landside elements of the Project. The commitments it contains are secured through Requirement 10 in Schedule 2 of the **dDCO [**PDA-004**]**.

	The need to achieve resource efficiency	As explained in further detail in the answer to Q1.4.1.2 the design of the Project has sought to achieve resource efficiency in all phases of the Project.
	The need to achieve climate change resilience	**ES Chapter 19: Climate Change [**APP-061**]** presents the results of a number of different assessments of the impacts of the Project in relation to climate change. It contains a lifecycle greenhouse gas impact assessment, climate change resilience assessment and an in-combination climate change impact assessment. The overall conclusion of the assessment is that the Project, through its production of 300MW per year of green hydrogen at full capacity, if used to displace natural gas used in industrial processes and diesel as a transport fuel, will have a significant net beneficial effect in climate change terms with an estimated net savings in tCO2e of -17,615,842 over the 25-year ES assessment timescale (**Table 19-20**). It will make a positive contribution to help meet Government's 10GW hydrogen production target by 2030 as set out in the Government's British Energy Security Strategy. The assessments of the Project also show, as appropriate, how the design of the Project is, as necessary, resilient to the impacts of climate change.
	The need to achieve	The **Outline Construction Traffic Management Plan ("CTMP") [**APP-223**]** outlines the controls intended to be used for the management and routing of Heavy

	sustainable transport	Goods Vehicle ("HGV") traffic associated with the construction of the Project. It also includes an Outline Construction Worker Travel Plan ("CWTP") at **Appendix A** which is designed to promote and encourage the use of sustainable transport modes and encourage shared transport modes by construction workers during implementation of the Project. The appointed contractor(s) will be required to use this Outline CWTP as a framework to prepare the final CTWP prior to the commencement of construction. The **Outline CTMP** is legally secured through Requirement 7 in Schedule 2 of the **dDCO [**PDA-004**]**. The Applicant has also prepared an Outline Operational Travel Plan which is being submitted to the Examination at Deadline 1 **[TR030008/EXAM/9.33]**. The objective of this Outline Operational Travel Plan is to reduce the impact of transport across the operational life of the Project and it includes specific measures to achieve this. It will be developed into a final Operational Travel Plan for implementation in consultation with NELC prior to operation of the Project pursuant to a new Requirement in Schedule 2 of the Development Consent Order as updated at Deadline 1 **[TR030008/APP/2.1 (3)]**.
	The need to achieve accessibility and social inclusion	**ES Chapter 23: Socio-economics [**APP-065**]** presents an assessment of the impacts of the Project in terms of employment opportunities, impacts on Public Rights of Way ("PRoWs") and on private and public assets.

		There is one PRoW which will be temporarily partially closed and diverted during the first phase of construction of the Project. The Applicant is seeking to acquire a number of residential properties likely to be affected by the Project in light of their proximity to the proposed hydrogen production facility (further information is contained within the **Statement of Reasons [**AS-008**]**). **Table 23-15** identifies that it is anticipated that the Project will likely create 627 jobs (net) during construction. **Table 23-16** identifies that the construction will likely generate £34,959,639 Gross Value Added during the construction phase. **Table 23-18** predicts that the Project will likely generate a net additional 207 jobs during operation. These employment opportunities are considered to be a major beneficial effect of the Project. It is acknowledged that the loss of residential properties results in a moderate adverse effect. It should be noted, however, that, in planning terms, this loss sits in a context whereby NELC is currently able to identify 13.1 years of housing land supply according to its latest published assessment (April 2023) which puts it in the top ten of authorities in the country in terms of five year housing land supply. **ES Chapter 24: Human Health and Well-being [**APP-066**]** addresses matters relating to human health and wellbeing during the construction and operation of the Project. It identifies a number of minor adverse (not

		significant) impacts during construction but also major/moderate beneficial effects in terms of access to employment and training opportunities during construction/operation respectively.
	The need to achieve crime and fear of crime reduction	Given the nature of the Project, the Applicant is required to design the site in accordance with applicable legislative requirements (amongst other things) to ensure that statutory operational and safety requirements are met. This includes ensuring the site is secure in order to minimise risk of criminal activity.
	The need to achieve the protection and enhancement of heritage assets	**ES Chapters 14 [**APP-056**]** and **15 [**APP-057**]** present the findings of the assessment of the effects of the Project in respect of the terrestrial and marine historic environments respectively. In terms of the former, the **ES** concludes that the Project occupies an area of relatively low archaeological significance and the measures contained in the **Outline CEMP [**APP-221**]** will ensure that appropriate measures are employed to avoid and minimise any potential impacts. In terms of the marine environment the **ES** identifies the potential for adverse impacts associated with the construction of jetty infrastructure and capital dredging, but when taking into account the measures included in the **ES Appendix 15.B: Outline Marine Archaeological Written Scheme of Investigation [**APP-204**]** these are considered sufficient to reduce

		any residual risk to negligible levels (**Table 15-8** of **ES Chapter 15 [**APP-057**]**).
	The need to achieve high quality public realm	The site is not a publicly accessible site and sits within a wider heavily industrialised landscape. The Applicant has acknowledged that the Project will result in temporary minor adverse effects (not significant) to users of Public Bridleway 36 during construction but has taken steps to provide an appropriately designed diversion to minimise this disruption (see **ES Chapter 23: Socio-economics [**APP-065**]**).
	The need to achieve the efficient use of land	The Project has been designed to make an efficient use of land whilst complying with statutory, safety and functional requirements of regulatory regimes operating beyond the land use planning process as set out in the response to Q1.4.1.2.
	Design informed by NELC design guidance	Chapter 4 of Design North East Lincolnshire: places and spaces renaissance (2008) deals with Industrial and Port development. In summary it requires all new development in industrial and port areas to: - Be legible - Make a positive contribution to place - Be of an appropriate and proportionate scale and massing - Make a positive contribution for non-HGV, public transport and pedestrians/cyclists - Have a simple and legible urban realm

		- Ensure that tall buildings and structures are designed to reduce their impact if viewed against non-industrial backdrops The Applicant demonstrates in **Planning Statement Appendix G [**APP-233**]** (and in its response to Q1.4.1.2) how the design of the Project is appropriate to its context and how the design has evolved in response to consultation to reduce adverse impacts consistent with the requirements of the NELC design guidance.
	Where applicable and relevant, the objectives and expectations of the Lincolnshire Wolds Area of Outstanding Natural Beauty ("AoNB") Management Plan 2013-2018	The Project will not affect the Lincolnshire Wolds AoNB, therefore, this aspect of the policy is not relevant.
	Where applicable and relevant, the Landscape	The landscape character of the area is industrial. **ES Chapter 13: Landscape & Visual Impact [**APP-055**]** identifies that the Project sits within the Humber Estuary and Lincolnshire Coast and Marshes National Character Areas. In terms of a Regional Character

	Character Assessment	Assessment "*…this is defined by the industrial features along the coast clustered around the deep-water Port of Immingham. The assessment describes the visual dominance and unique character created by views of the large and tall structures, such as Lindsey Oil Refinery, which are linked with the port and heavy industry. The value of this character area is assessed to be low as the area is dominated by industrial elements and processes*" (**Paragraph 13.6.9**). This assessment is also manifest in the local character assessment whereby the character is described as "*Landscapes visually dominated by large or massive structure serving as docks, storage, factories or petrochemical installations. These structures are often separated by extensive open arable land with hedges and groups of trees playing little compositional role in the landscape*" (**Paragraph 13.6.12**) though it is acknowledged that parts of the study area fall within the open farmland and wooded open farmland character areas (**Paragraphs 13.6.15** and **13.6.17**). The design of the Project is consistent with this landscape character in terms of the backdrop of heavy industrial and port use and the landscape such uses necessitate. As noted in **Paragraph 1.6.2** of **Planning Statement Appendix G – Design Evolution [**APP-233**]** "*the design of the Project is compatible with its location within and adjoining the Port, which is industrial in nature and supported in planning policy for growth in*

		relation to ports and logistics related development. Good design has been delivered by ensuring that marine side and land side infrastructure is functional and fit for purpose, avoiding and minimizing adverse effects as far as reasonably possible. This accords with the approach to good design as set out in the National Policy Statement for Ports which recognises that high quality and inclusive design goes far beyond aesthetic considerations".
	Where applicable and relevant, Conservation Area Appraisals	The Project does not impact on any conservation areas so this policy criterion is not relevant to the Project.
	Design and Access Statement	The Planning Act 2008 does not require the preparation of a Design and Access statement. However, the **Planning Statement [**APP-226**]** and its appendices (**Appendix A [**APP-227**]** in particular) demonstrate how the Project has been designed to accord with relevant policy. **Planning Statement Appendix G [**APP-233**]** also explains the design evolution of the Project, which is further explained in the Applicant's answer to Q1.4.1.2.
	Public Art	The Project does not sit within a prominent public or heritage location and will not, for safety and security reasons, be accessible to the general public.

		Accordingly, this policy criterion is not relevant to the Project.
	Advertisements	No advertisement consent is sought as part of the Project, so this policy criterion is not relevant.

Q1.4.2 Design Details	
Q1.4.2.1	
Question	**Response**
Work No. 1 The dDCO describes Work No. 1 [APP- 006, Schedule 1, Part 1, Paragraph 1] and the ES provides sections through this work [APP-014 Sheets 1 and 2]. Provide an explanation for the height requirement of the concrete beam superstructure above the concrete deck and whether this can be reduced.	The height of the concrete beam superstructure is dependent upon the deck loads and the longitudinal span length between the supporting piles. The design loads are set by operational needs and the height of the concrete beam superstructure is determined in accordance with Eurocode standards. The longitudinal pile spacing has been optimised during RIBA 2 design to provide mitigation to any hydrodynamic effects on the mud flats. The final thickness will be determined through detailed design.
Q1.4.2.2	
Question	**Response**

Work No. 2 The dDCO indicates maximum heights for built elements and finished ground level [APP- 006, R4, Table 1]. a) Given the sensitivity of Work No. 2 that runs through the existing Long Strip Woodland, explain why the maximum finished ground level is indicated as being 5m AOD and where this might occur along the length of Work No.2. b) Provide sections through Long Strip showing the proposed height of the jetty access road in relation to the existing features, natural and manmade. (Continuation of [APP-014 Sheet 3, Section A-A]).	(a) The new ground works are relatively low level with minimal impact on the existing topography. See typical sections in drawing 2205097-RAM-02-LS-SK-C-9002, attached as **Appendix 1**, to visualise this. The reason for the indication of 5m Above Ordnance Datum ("AOD") was twofold: first, to allow a degree of design development of the roadway and drainage systems and second, it is also recognised that along the boundary with APT's site there is a bank that exists at approximately 5m AOD and landscaping works are likely to be required to facilitate APT's emergency egress re-routing – see section at chainage 230m for an illustration of this. The typical road levels within Long Strip will be between 3.5m AOD and 3.68m AOD, rising in the section closer to Laporte road (outside of Long Strip) to approximately 4.3m AOD. (b) Drawing 2205097-RAM-02-LS-SK-C-9001 (**Appendix 2**) shows section A-A extended to show the roadway levels, between 3.5m AOD and 3.68m AOD within the Tree Preservation Order ("TPO") area. Drawing 2205097-RAM-02-LS-SK-C-9000 (**Appendix 3**) has been provided to show where the sections have been taken.
Q1.4.2.3	
Question	**Response**
Access from Laporte Road Provide contextual elevations of the proposed road accesses from Laporte Road into Work Nos. 2 and 3.	Contextual elevations of Work Nos. 2 and 3 are provided at **Appendix 4 and 5** in this document. These plans show cross sections of the proposed arrangement on Laporte Road for Accesses J, K and L, as defined on **Sheet 4** of the **Street Works and Accesses Plan [**APP-016**]**.
Q1.4.2.4	

Question	Response
Temporary Construction Work Nos. 8 and 9 are identified as Temporary Construction areas [APP-044]. a) Provide indicative plans showing the extent (area and maximum heights) of the temporary constructions in Works 8 and 9. b) Provide indicative temporal requirements for these elements and whether they relate to specific Work Nos	a) Indicative plans for Work Nos. 8 and 9 are provided at **Appendix 6 and 7** in this document. These plans update those provided as **Plate 2-3** and **Plate 2-4** in **Environmental Statement Chapter 2: The Project [**APP-044**]**. In both Work Nos. 8 and 9, the maximum height for single storey buildings and welfare facilities is expected to be approximately 3m above current ground levels. The area of Work No. 8 is approximately 12,500m^2 and Work No. 9 is approximately 81,000m^2. b) Work No. 9 would be used during construction of Phase 1 of the Project, for between 2.5 and 3 years. It is expected primarily to support Works Nos. 1, 2, 3 and 4. Work No. 8 would be used during construction of Phase 1 but may also be used for longer to support further phases (Phase 2 onwards) of the build out of the Hydrogen Production Facility. It is primarily expected to support Work Nos. 5 and
Q1.4.2.5	
Question	**Response**

Work No. 7 Indicate how the Proposed Development contributes to the quality of the area, as required by NPSfP Paragraph 4.10.3, in particular (but not limited to) Work No. 7.	Paragraph 4.10.3 of the National Policy Statement for Ports ("NPSfP") states "*the decision-maker should satisfy itself that the applicant has taken into account both functionality (including fitness for purpose and sustainability) and aesthetics (including its contribution to the quality of the area in which it would be located) as far as possible. Whilst the applicant may have no or very limited choice in the physical appearance of some port infrastructure, there may be opportunities for the applicant to demonstrate good design relative to existing landscape character, landform and vegetation.*" **Site context** The Project is located in and adjacent to the Port of Immingham within an area that is industrial in nature, being dominated by port infrastructure, chemical manufacturing, oil processing and power generation facilities. **Environmental Statement ("ES") Chapter 13: Landscape & Visual Impact [APP-055]** refers to the North East Lincolnshire Council ("NELC") Landscape Character Assessment (NELC, 2010) which identifies that the Project is located within an industrial landscape. The character of this area is described as "*Landscapes visually dominated by large or massive structures serving as docks, storage, factories or petrochemical installations. These structures are often separated by extensive open arable land with hedges and groups of trees playing little compositional role in the landscape.*" **Paragraph 13.6.14** of **ES Chapter 13: Landscape & Visual Impact [APP-055]** states that "*The NELC Landscape Character Assessment (Ref 13-37) notes that value of LLT 1 is assessed to be very low due to the dominance of detracting features and industry.*" Given the existing industrial character of the area, as stated in **Planning Statement Appendix G – Design Evolution [APP-233]**, the Project is entirely appropriate for its location and context.

	Design quality The overarching design principles that have driven the Project forward thus far and would drive it forward in later stages relate to the need to comply with operational, technical and environmental requirements and matters as explained further in the response to part c) of Q1.4.1.2. Furthermore, how the Project would deliver NPSfP policy requirements related to good design is demonstrated in part d) of Q 1.4.1.2. As part of that, the Applicant and Air Products have considered the opportunities to influence the visual appearance of the Project, which is explained in detail in Q1.4.1.2. There are features embedded in the design that will help to integrate the Project into the landscape, including proposed wildflower grassland creation, planting of native trees, shrubs and hedgerows to create nesting habitat for birds and to provide sources of berries for overwintering birds, and the installation of bird and bat boxes, as set out in the **Outline Landscape and Ecology Management Plan [APP-225]**. The measures demonstrate that opportunities have been taken to achieve good design, to the extent possible, relative to existing landscape character, landform and vegetation, in accordance with Paragraph 4.10.3 of the NPSfP. Furthermore, the use of appropriate materials for key landside buildings will contribute to overall design quality. These matters are proposed to be approved by the local planning authority through Requirements in the **draft Development Consent Order ("dDCO") [PDA-004]** (notably Requirement 4) which in turn will ensure (in accordance with the wider policy contained within NPSfP Paragraph 4.10.3) that the Project is not only as durable and adaptable as it can be, but is also as attractive as it can be.

	The scale of the Project is significant, with substantial structures both landside and marine side. The hydrogen production facility for example is an industrial complex, and its overall appearance is industrial in nature; this is driven by project functional requirements, constraints and design principles required for such process plant and equipment. The height or scale of some structures reflect operational, safety and environmental reasons. However, as far as possible the Project has sought to achieve a high quality design outcome, contributing to the quality of the surrounding industrial area and integrating with its surroundings. The Applicant's response to Q1.4.1.2 provides a further explanation of the design evolution of the Project. The jetty (Work No. 1) has been designed in accordance with operational, technical and safety requirements. Crucially the design of the jetty has sought to minimise environmental effects on intertidal habitats as demonstrated in the **Without Prejudice Report to inform Habitats Regulations Assessment (HRA) Derogation [APP-235]**. Together, these factors limit the opportunity to influence and enhance its layout and visual appearance. However, the design process has taken account of nearby jetties located at the Port of Immingham, and in particular the neighbouring Immingham Oil Terminal ("IOT") jetty, and the physical appearance of the jetty is appropriate and compatible with surrounding port infrastructure. Measures were undertaken to align the physical characteristics of the jetty with the IOT and the other neighbouring jetties (e.g. by adopting a similar structural form and appearance) and limit both vertical and lateral spatial extent (e.g. by minimising jetty structure and topside equipment elevation and footprint) and minimise visual impact (e.g. by considering the form and colour of jetty buildings and tallest topside equipment). This approach accords with the approach to good design as set out in the NPSfP, which recognises in Paragraph 4.10.1 that

	high quality and inclusive design goes far beyond aesthetic considerations. The ammonia storage tank (Work No. 3) is an unavoidably large structure due to operational requirements as it has been designed to provide storage for 55,000 tonnes of liquid ammonia (the tank has in the order of 81,000m^3 of useful volume). As shown on **Figure 1** of the **Outline Landscape and Ecological Management Plan [APP-225]**, there are opportunities for landscape and biodiversity areas in Work No. 3 where the ammonia tank would be sited, notably at the boundaries with Laporte Road and Queens Road. These landscaped areas would comprise amenity and species rich grassland, tree and shrub planting and hedgerow, and introduce low level characteristic landscape features along road frontages to provide filtering of views of the built structures at ground level. The paint finish of the ammonia tank would be agreed with the local planning authority to ensure that it integrates with its surroundings, to the extent possible. Approval of the paint finish is secured by Requirement 4 of the **dDCO [PDA-004]**. Possible options may include a neutral colour as used on several local refinery tanks or a graduated colour scheme, as shown below, which would assist in assimilating the tank into the local landscape.

	
Local refinery storage tanks	Graduated colour scheme

The hydrogen production facility (Work Nos. 5 and 7) comprises a range of structures of varying heights together with complex apparatus. Whilst some structures are unavoidably large due to operational and technical (including engineering and safety) requirements, they are not dissimilar in scale to buildings on the Knauf site, opposite Work No 7, to the north, and therefore are appropriate in this industrial location. As noted, the wider area contains a number of other comparable industrial facilities in terms of matters of scale and massing and overall appearance which provides the context in which the Project should be viewed. As shown on **Figure 1** of the **Outline Landscape and Ecological Management Plan [APP-225]**, there are opportunities in Work No. 7 for landscape and biodiversity areas comprising amenity and species rich grassland, tree and shrub planting and hedgerow at the boundaries with the A1173, Kings Road and Queens Road. As a result, these areas would introduce low level characteristic landscape features along road frontages to provide filtering of views of the built structures at ground level. There are fewer opportunities for landscape and biodiversity areas in Work No 5 for security reasons, however there is an area of ornamental planting proposed that would be located adjacent to administration and welfare buildings which would provide an amenity area within the site itself.

	As shown on the **Illustrative Sections and Elevations [APP-014]** the height and scale of structures ranges across Work Nos. 5 and 7 in response to the technical and operational requirements of the hydrogen production facility. Approval by the local planning authority of external materials for any control room and workshop building, security and visitor building, contractor building and warehouse within Work Nos. 5 and 7, is secured by Requirement 4 in Schedule 2 of the **dDCO [PDA-004]**. It is anticipated that these buildings would have a metal clad finish with a colour which will be agreed with the local planning authority. Work Nos. 4 and 6 are underground and therefore not considered further in terms of how they contribute to the quality of the area. In conclusion, the Project has been designed, amongst other things, to fulfil its practical operational purpose and to also take account of the surrounding industrial context.
Q1.4.3 Design Development Process	
Q1.4.3.1	
Question	**Response**
Detailed Approval The dDCO requires LAs' approval for external materials to be agreed for several buildings, in R4 (1)(a)(b)(c). a) NELC, are you satisfied with the input required from you in R4 is limited to external materials? Or do you consider input on other matters of appearance should also be required? Explain with reasons.	**Answer to Q1.4.3.1(b)** As set out in the response to Q1.4.1.2, whilst the design of the Project is largely determined by operational and technical (including regulatory and safety) requirements which have to be satisfied, it has also taken account of environmental requirements and matters, including matters relating to landscape and visual impacts.

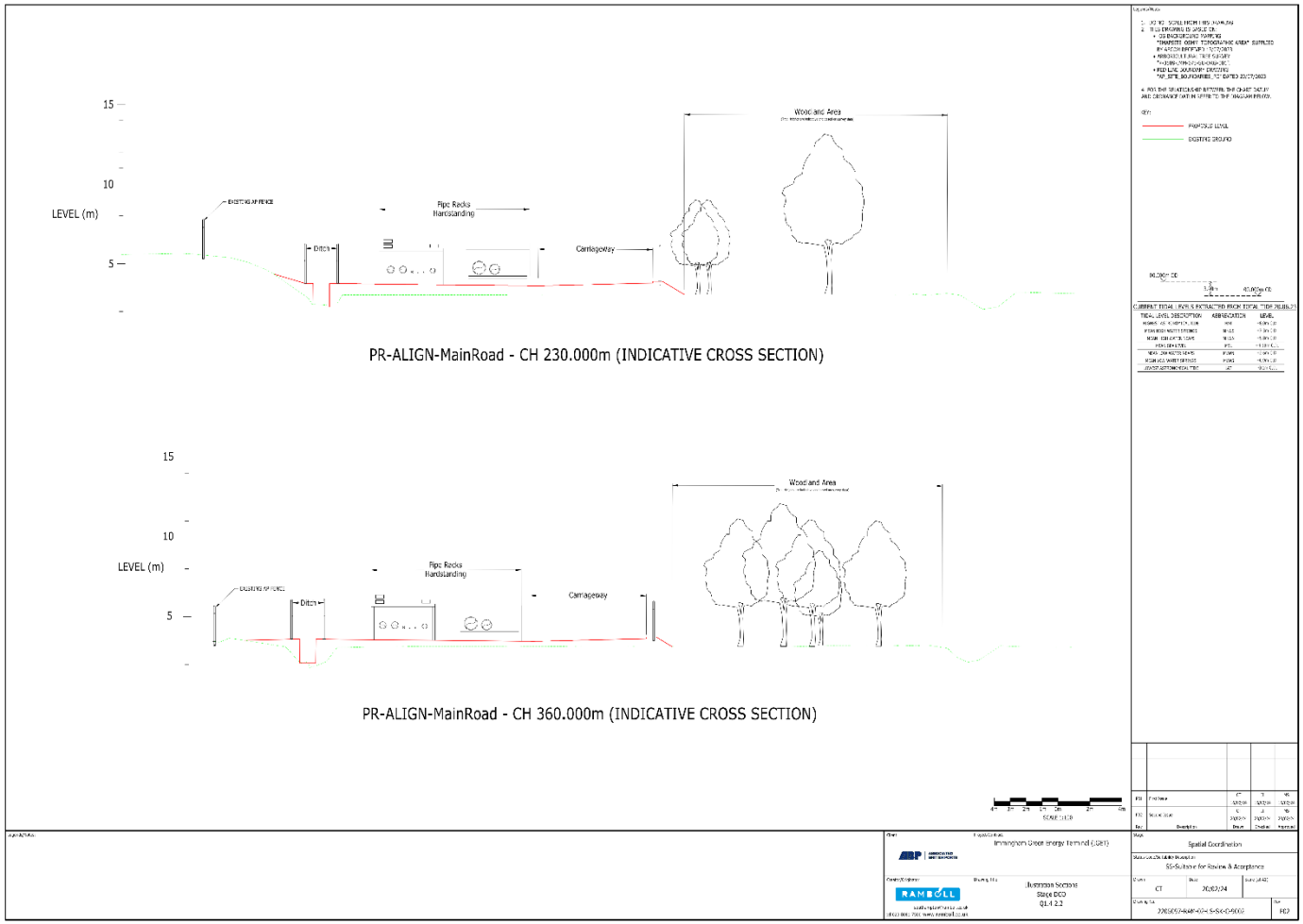
b) Applicant may also respond. c) Applicant, explain the process of detailed approval with reference to what has been secured through management plans and the dDCO? d) NELC, is the process of detailed approval with reference to what has been secured through management plans and the dDCO clear to you? And are you satisfied?	In particular, in relation to the hydrogen production facility, the detailed design must comply with other regulatory regimes, such as under the COMAH Regulations 2015, and in seeking an Environmental Permit, which are both separate to the planning process. In ensuring that buildings, structures and equipment meet operational and technical requirements, the opportunity to influence matters of appearance are limited. In this context, in terms of aesthetics and matters relating to visual appearance, the opportunity has been identified for North East Lincolnshire Council ("NELC") to approve the paint finish of the ammonia tank and the external materials of some key non-process buildings, as identified in **Requirement 4** in Schedule 2 of the **draft DCO [PDA-004]** and set out below in response to part c). It should be noted that NELC is the approving body for several other design related matters, including the design and layout of permanent accesses (**Requirement 8**), the landscape and ecological measures according with the **Outline Landscape and Ecology Management Plan** (**Requirement 10**), the Woodland Compensation Plan (**Requirement 11**) and operational external lighting (**Requirement 16**) as set out in Schedule 2 of the **draft DCO [PDA-004]**. **Answer to Q1.4.3.1(c)** **Requirement 4(1)** in Schedule 2 of the **draft DCO [PDA-004]** requires that prior to any works above ground floor slab of any security building in Work No. 2, any control building in Work No. 5, or any control room and workshop building, security and visitor building, contractor building and warehouse within Work No. 7, the Applicant must first submit details of the

	external materials for those buildings to NELC for its written approval, and such written approval must be obtained in order for above ground floor slab works to commence. **Requirement 4(2)** in Schedule 2 of the **draft DCO [PDA-004]** requires that the ammonia storage tank within Work No. 3a must not be brought into operational use until details of the external paint finish for the tank have also been submitted to and approved by NELC. It is envisaged that Air Products will consider the options available and how they minimise visual impact; then present those options (including a preferred option or options) to NELC for consideration and ultimately approval. No additional management plans are proposed to control these elements of the Project design.
Q1.4.3.2	
Question	**Response**
Design Review NPSfP (Paragraph 4.10.5) states "At an early stage, applicants and the decision-maker should consider seeking professional and independent advice on what constitutes 'good design' of a proposal." a) Applicant, confirm whether you are intending to use independent Design Review advice and/or whether you have a Design Champion on the development team. b) NELC, would you consider the use of independent Design Review advice to be useful?	As set out in the answer to Q1.4.1.2(c), the design principles in respect of which the design of the Project has been undertaken include the need to comply with industry, national and local standards and with other regulatory regimes, such as the COMAH regulatory regime, which is a separate but parallel regulatory regime to planning, administered by the Competent Authority (jointly comprising the HSE and the EA). As is explained in the response to Q1.4.1.2(c) this is a limiting factor in terms of the design of the Project. The ongoing detailed design of the Project will be undertaken by relevant technical specialists, who will take into account the relevant legislation, regulations and other matters that provide the framework to meet the necessary operational and technical (including safety and security) requirements.

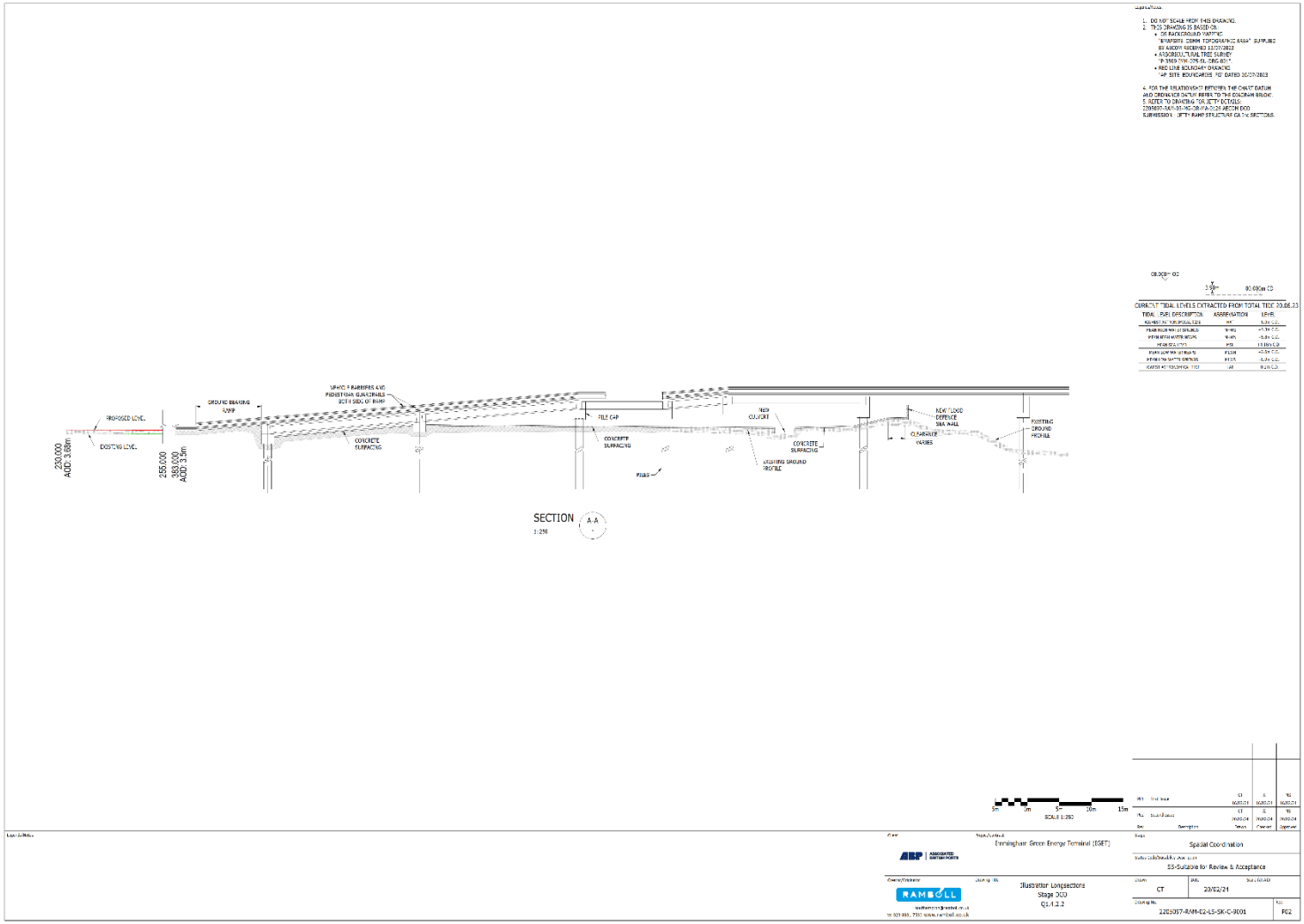
Explain with reasons.	Design reviews will be undertaken in various forms by external bodies including, for example, through the COMAH pre-construction safety report (reviewed by HSE/EA) and Pressure Systems Safety Regulations 2000 certification process (carried out by an independent notified body). As stated in the response to Q1.4.1.2, the Applicant has sought to achieve good design by providing a development that is functional, including being fit for purpose and sustainable, as far as possible. The Applicant's evidence on design demonstrates that the Project is sustainably designed and is as attractive, durable and adaptable as it can be. As a result, additional independent Design Review advice (i.e. additional to the technical design reviews referred to above) will not be sought, and a Design Champion is not included in the development team. 'Design champion' is not a role that is usually used in process engineering and process development projects, due to the regulatory, safety and engineering constraints and project structure. The jetty itself has similar constraints. Furthermore, where matters are able to be subject to subsequent detailed design approval, for example, through the discharge of Requirement 4 'Detailed Design' in the draft Development Consent Order [**PDA-004**], the local planning authority will be able to approve those detailed design matters to thereby ensure that, in line with the policy contained within the National Policy Statement for Ports ("NPSfP"), the development is as attractive as it can be (as explained in the responses to Q1.4.2.5 and Q1.4.3.1).

3 Appendices to the Applicant's Responses to the Examining Authority's First Round of Written Questions

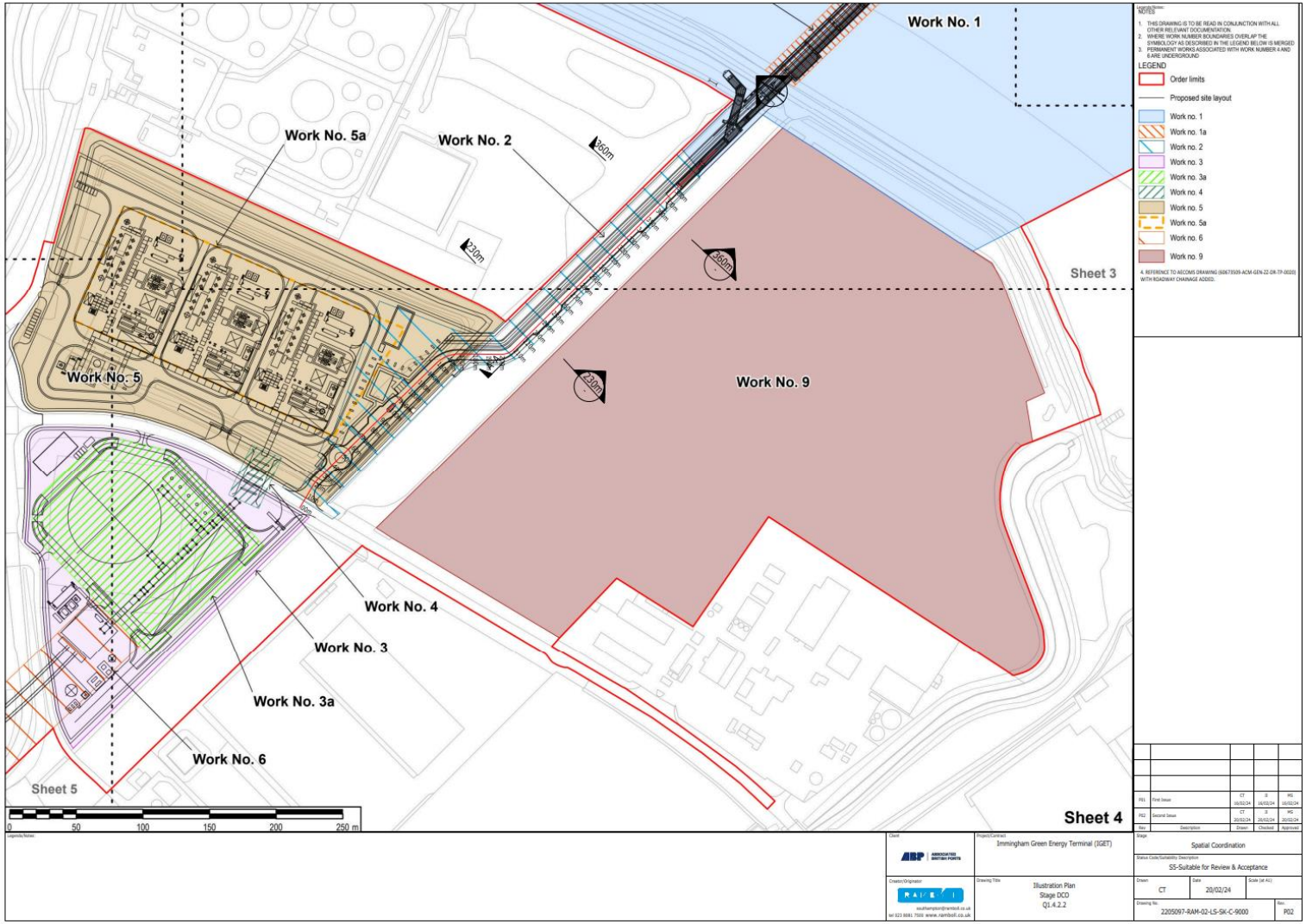
Appendix 1 - 2205097-RAM-02-LS-SK-C-9002



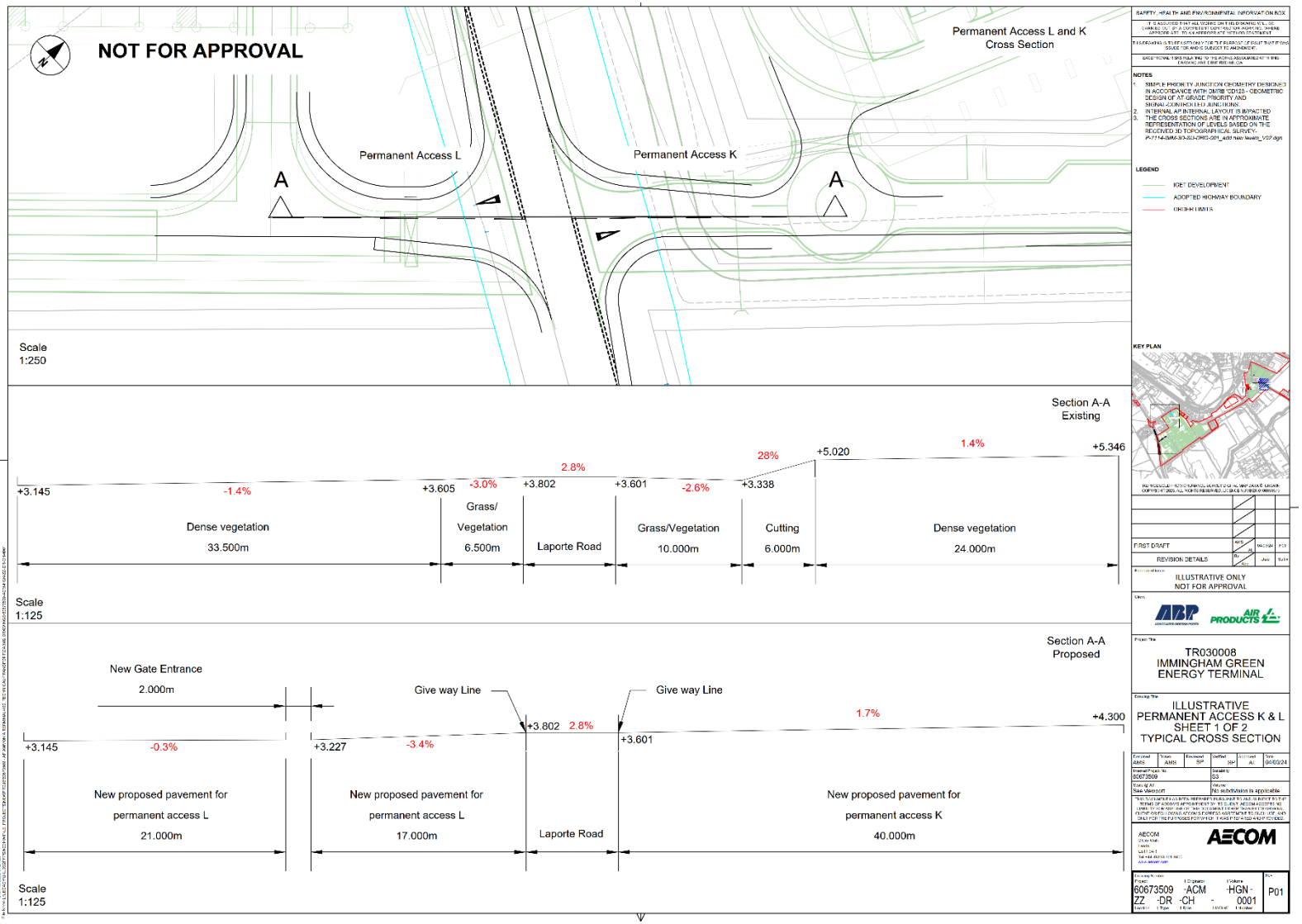
Appendix 2 - 2205097-RAM-02-LS-SK-C-9001



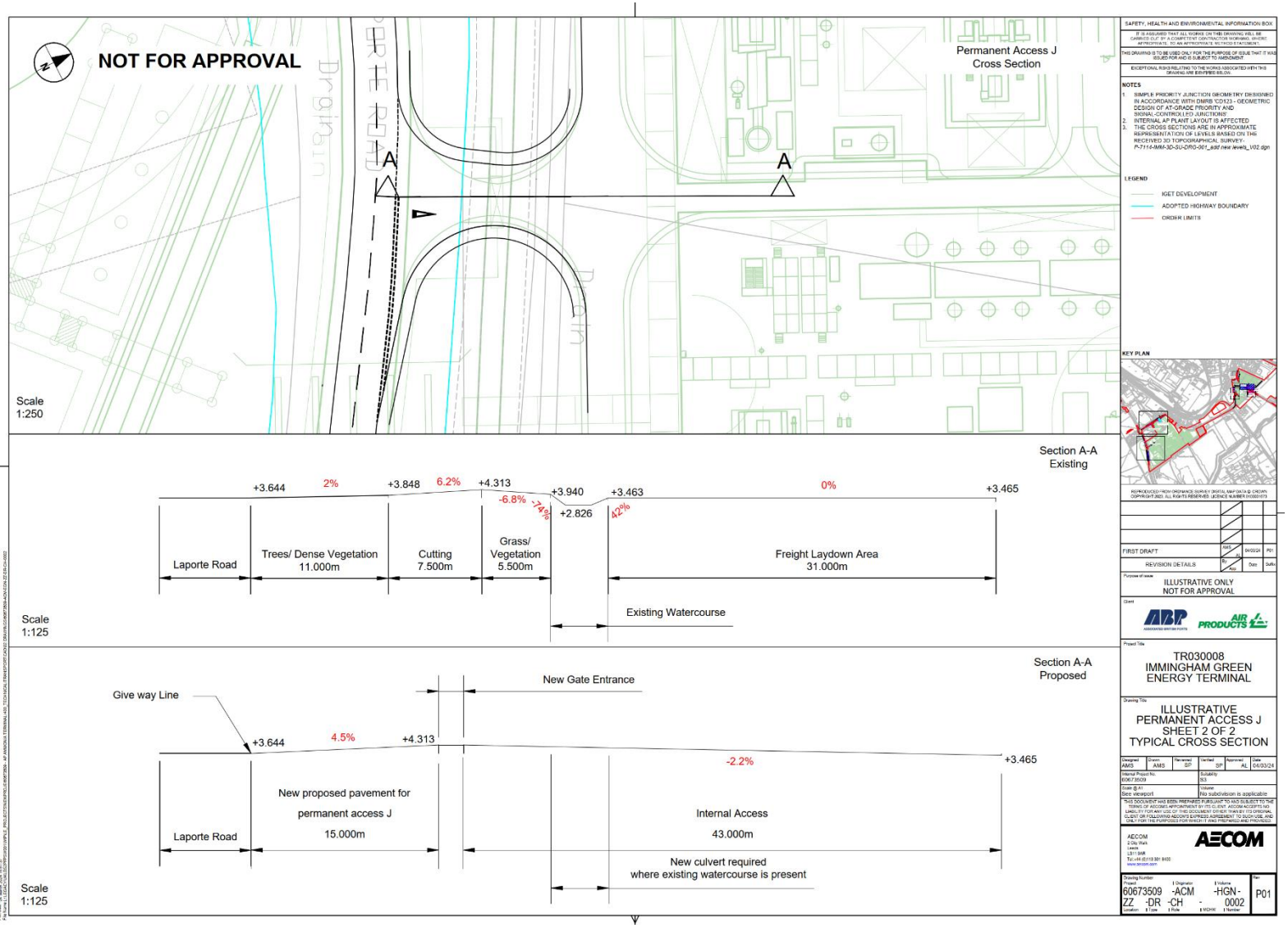
Appendix 3 - 2205097-RAM-02-LS-SK-C-9000



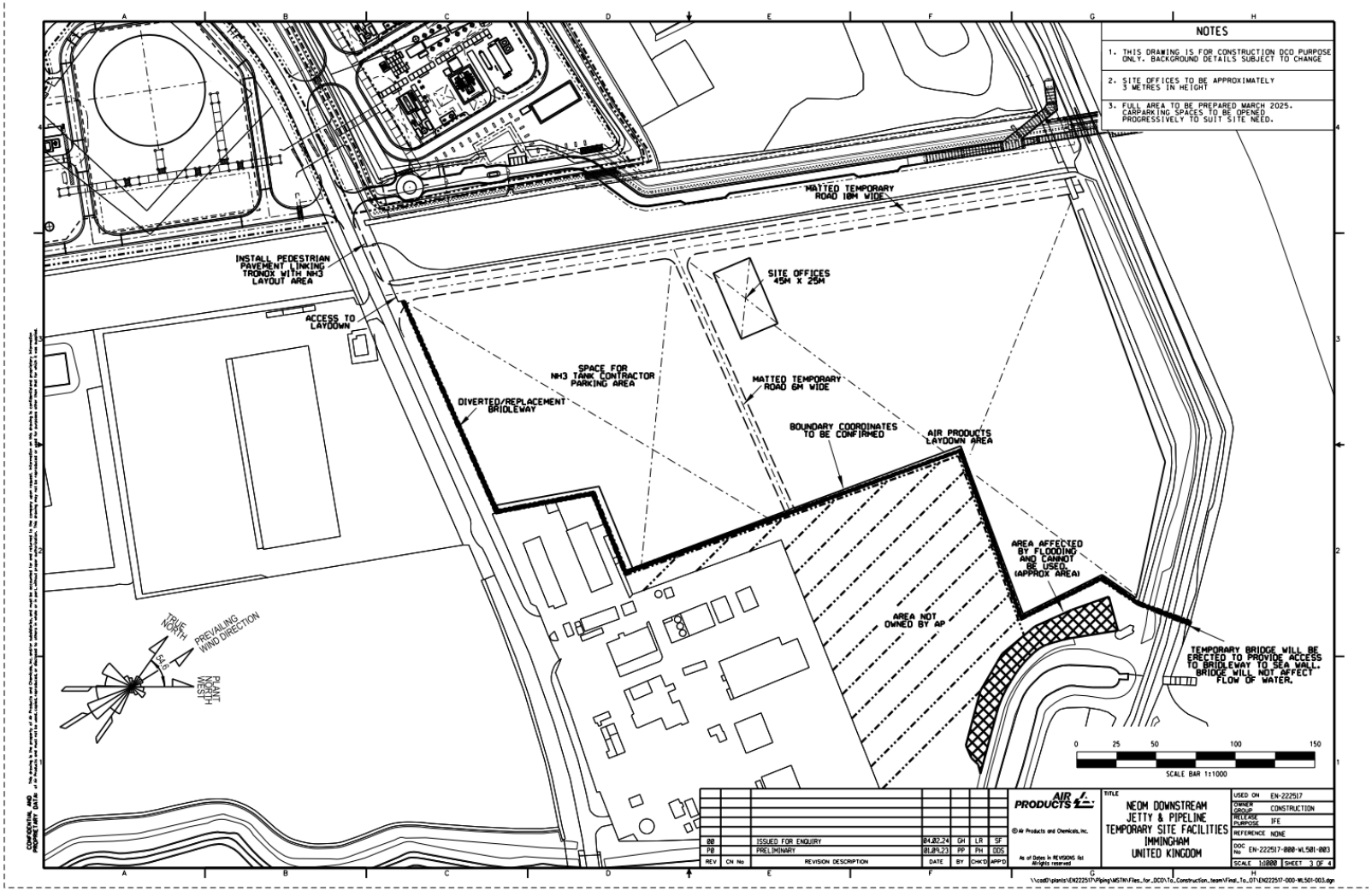
Appendix 4 - 60673509-ACM-HGN-ZZ-DR-CH-0001 [Elevation K and L]



Appendix 5 - 60673509-ACM-HGN-ZZ-DR-CH-0002 [Elevation J]



Appendix 6 - EN222517-000-WL501-003 Rev01



Appendix 7 - EN222517-000-WL501-004 option 2